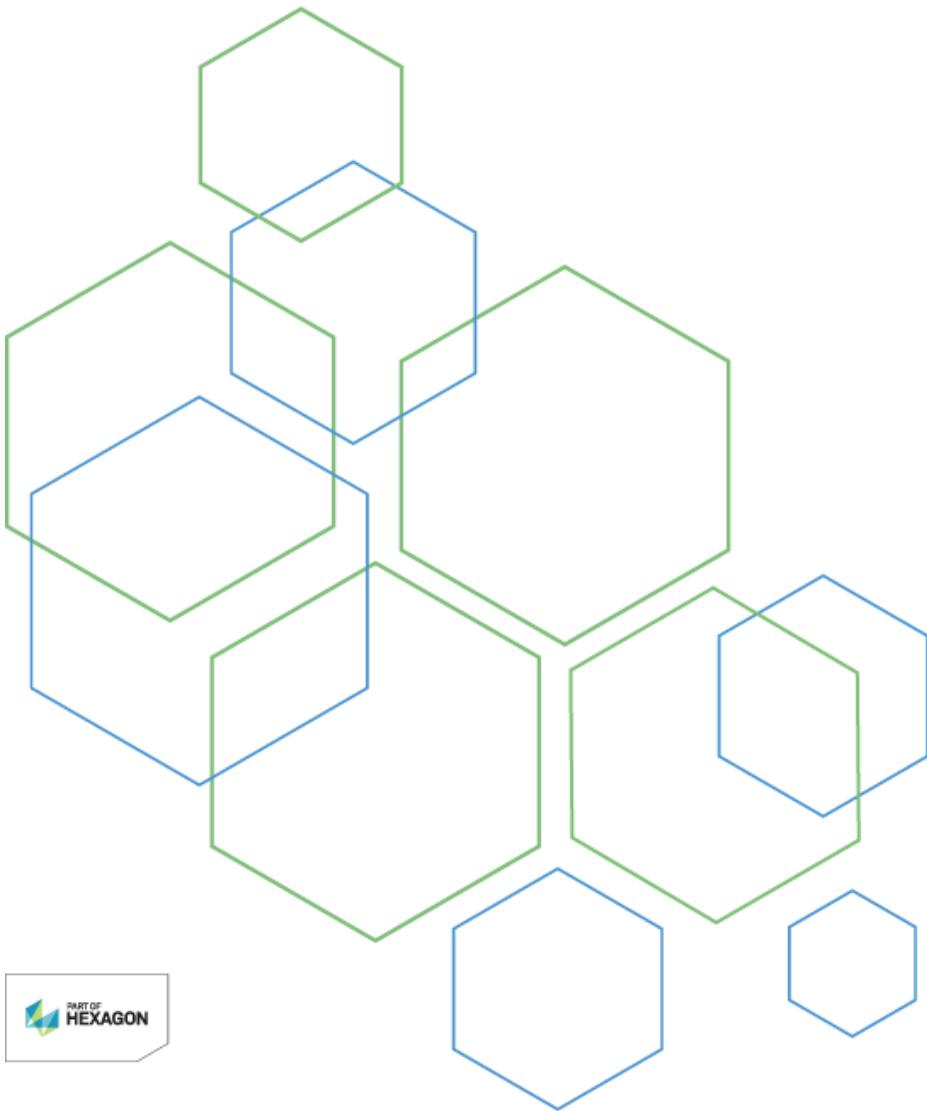


INTERGRAPH®  
**Smart** → 3D  
Common  
User's Guide



Version 2016 (11.0)  
November 2016

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# Preface

This document is a user's guide for the Common functionality of Intergraph Smart™ 3D and provides command reference information and procedural instructions.

## Documentation Comments

For the latest support information for this product, comments or suggestions about this documentation, and documentation updates for supported software versions, please visit *Intergraph Smart Support* (<https://smartsupport.intergraph.com>).

## What's New in Common

The following changes have been made to the Common task.

### Version 2016 (11.0)

- Added an appendix that details the available units of measure. For more information, see *Appendix: Units of Measure* (on page 623).
- A new tab, **Point Cloud**, has been added to **Filter Properties** dialog box. For more information, see *Point Cloud (Filter Properties Dialog Box)* (on page 376). (P1 CP:246829)
- You can now use your mouse's scroll wheel to navigate through the **QuickPick** selection list. This feature allows you to select the exact object that you want without having to move the cursor. In addition to the scroll wheel, you can still use the keyboard arrow keys and ENTER or your mouse to select an object from the **QuickPick** list. (P1 CP:248411)
- The **Rendering** tab in the **New View Style** dialog box is renamed to **Display** tab. For more information, see *Display Tab (New View Style Dialog Box)* (on page 322). (P1 CP:250683)
- New options have been added to the **Synchronize Workspace** dialog box. For more information, see *Synchronize Workspace Dialog Box* (see "Synchronize Workspace with Catalog Dialog Box" on page 473). (P1 CP:263958)
- **Move and Modify End Features** treats unfinished ends of route objects as free end features. For more information, see *Move* (on page 157). (P1 CP:267285)
- To make reading command prompts easier, the status bar can be moved to be below the ribbons and above the graphic views. (P2 CP:38833)
- You can now add a unit delimiter between primary and secondary units in a report label. For more information, see *Unit of Measure Dialog Box (Label Editor)* (on page 516). (P2 CP:140982)
- You can view cable schedule documents in the **Design Basis Viewer**. The **Design Basis Viewer** supports a context menu with convenient commands. The **Design Basis Viewer** is also available when the Electrical task is active. For more information, see *Design Basis Viewer Command* (on page 600). (P2 CP:244904)
- The default background, highlight, and selected element colors have changed. You can customize these colors by selecting **Tools > Options**, and then selecting the **Colors** tab. (P2 CP:249730)

- You can now use the mouse scroll wheel to Zoom In, Zoom Out, and Pan the views without invoking the commands either from shortcut keys or by clicking a toolbar icon. For more information, see *Zoom Tool* (on page 212) and *Pan* (on page 231). (P2 CP:251218)
- Updated information on **PDS Import** and **Import XMpLant Data**. For more information, see *PDS Import* (on page 55) and *Import XMpLant Data* (on page 62). (P2 CP:251249)
- You can now select templates based on the project mode for new sessions. For more information, see *New Dialog Box* (on page 42). (P2 CP:259728)
- The software now automatically fits in a graphic view the object associated with the **To Do List** entry that you selected in the listing. For more information, see *To Do List Dialog Box* (on page 255). (P2 CP:263920)
- The **Update** command on the **To Do List** dialog box now remains disabled if the object you selected to update has a working status of **In Review** or **Approved**, belongs to another global workshare site, or you do not have sufficient permissions to edit the object. (P2 CP:263923)
- A status bar has been added to the **To Do List** dialog box that provides immediate feedback to your **To Do List** operations. (P2 CP:263930)
- Added a new SmartSketch option, **Virtual Box**. For more information, see *SmartSketch Options* (on page 398). (P2 CP:264306)
- Added a new option, **Lock CTRL key**, to the **Filter Properties** dialog box. For more information, see *Filter Properties Dialog Box* (on page 368). (P2 CP:264514, P1 CP:299478)
- Information related to **Paste Dialog Box** and **Copy and paste an object** has been updated. For more information, see *Paste Dialog Box* (on page 143) and *Copy and paste an object* (on page 142) (P2 CP:264979)
- Added a note about the placement of **Control Points**. For more information, see *Control Point* (on page 273). (P2 CP:269823)
- Information related to PDS Model Reference has been removed. For more information, see *Workspace Explorer* (on page 233). (P2 CP:276780)
- Added the **Repair Duplicate Permission Group ID** custom command. For more information, see *Custom Commands* (on page 462). (P2 CP:278972)
- Added information about **Copy** and **Paste** including a copy of the parent run for route objects. For more information, see *Copy* (on page 137) and *Paste* (on page 138). (P2 CP:273989)
- Added a new custom command, **Placing Supports from XLS**. For more information, see *Custom Commands*. (P2 CP:284643)
- Updated the keyboard shortcuts for the **Fit**  command. For more information, see *Fit* (on page 231). (P2 CP:287993)
- Added best practice information for using **Delete Optional** during paste operations. For more information, see *Paste* (on page 138). (P2 CP:270710)
- **QuickPick** functionality has been updated. You can now activate **QuickPick** by pressing CTRL and clicking your mouse wheel. You can select items in the **QuickPick** list by clicking either your left mouse button or your mouse wheel, and you can right-click to close **QuickPick**. The list displays up to 10 items in the list. (P3 CP:251232)
- Added the **Drawings** tab to the **Workspace Explorer**. For more information, see *Workspace Explorer* (on page 233). (P3 CP:271276)

- Corrected notes on the behavior of messages for the **Remove Correlation with Design Basis** command. For more information, see *Remove correlation with design basis* (on page 599). (P3 CP:295894)
- For piping and equipment objects in plant mode, **Insulation**, **Equipment Hole**, **Maintenance**, and **Operation** aspects displaying in the 3D graphic view also display in the Sketch 2D environment. For more information, see *Format View Dialog Box* (on page 299). (P4 CP:119768)
- A new option, **Point Grid Display**, allows you to specify whether to use point grid spacing. To customize the spacing, specify primary and secondary point spacing on the **Point Grid Display** tab of the **Tools > Options** dialog box. For more information, see *Format View Dialog Box* (on page 299) and *Point Grid Display Tab (Options Dialog Box)* (on page 523). (P4 CP:260473)
- A new ribbon, available under **Insert > Construction Graphics**, allows you to place geometric shapes in the graphic view to stand in for objects that you have not yet drawn or that you do not have permissions to draw. You can now place the following shapes in the graphic view: line, line string, arc, circle, or rectangle. For more information, see *Construction Graphics* (on page 289). (P4 CP:262741)
- Added a note that changes to the piping material class rules do not cause the software to mark pipelines as **Out of date** in the **To Do List**. For more information, see *To Do List* (on page 252). (P4 CP:270853)
- Information related to **Select by Filter** and **Filter Properties Dialog Box** has been updated. For more information, see *Select by Filter* (on page 354) and *Filter Properties Dialog Box* (on page 368). (P4 CP:272795)
- Corrected notes on the behavior of original systems when using the **Past and Restore** command. For more information, see *Paste and Restore* (on page 145) and *Paste Dialog Box* (on page 143). (P4 CP:273368)
- When defining a workspace, roles now work across all object types and can improve performance. For more information, see *Define Workspace Dialog Box* (on page 47) and *Define roles* (on page 49). (P4 CP:258039)
- Use the new **Load Hierarchy** command to view the hierarchy of Reference 3D model objects in the Workspace Explorer. For more information, see *Reference 3D Hierarchy in the Workspace Explorer* (on page 240). (P3 CP: 170420)
- A new **Fabrication and Construction** category has been added to Reference 3D member part properties so that you can define **Construction Type** and **Construction Requirement** property information. For more information, see *General Tab (Reference 3D Generic Element Properties Dialog Box)* (on page 248). (P2: CP: 286787)
- The **Publish > UpdatePublish** command is now called **Publish > Update and Publish**.
- Added **Include** and **Exclude** commands to the **Tools** menu for Reference 3D objects with specific model types. An **Exclude** causes Smart 3D to remove the selected Reference 3D objects from the graphics view, clash reports, drawings, reports, and exports on client and distributed systems in a global workshare environment. For more information, see *Exclude and Include Reference 3D Objects* (on page 383). (P2 CP: 276166)
- You can edit the **Approval State** of Reference 3D elements by selecting the appropriate status displayed in the **Configuration** tab of the **Reference 3D Generic Element Properties** dialog box. For more information, see *Configuration Tab (Reference 3D Generic Element Properties Dialog Box)* (on page 249). (P2 CP: 287658)

- Smart 3D has enhanced its anti-alias capabilities for 3D object display by providing high quality, smooth edges in **Outline**, **Smooth Shaded**, and **Shaded with Enhanced Edges** modes. The smooth edge setting is enabled by default. For more information, see *Format View Dialog Box* (on page 299). (P2 CP: 290361)
- For compatibility with the SmartPlant Foundation requirement that specific object properties must have a value, Smart 3D can now update and publish objects with null values for the required properties by providing a base default value. Refer to the Smart 3D-generated log file for more information on the properties containing the added default values. For more information, see *Publish documents* (on page 557). (P2 CP: 300947)

## SECTION 1

# Common Overview

The various software tasks share some common operations like the **View** and **File** menu commands. You use the Common task commands and functionality in the same way—regardless of the active task; however, some of the commands and functionality are unique to a particular task. For example, some commands within the Piping task are not available in the Equipment and Furnishings task.

### The Workspace

The workspace represents the portion of the model data on which you perform your intended task, and it includes view properties for modeling. The Common task allows you to define that workspace and perform common operations on it. You can lock the **Workspace Explorer**'s node expansion by selecting the **Lock Tree**  option. For more information, see *Workspace Explorer* (on page 233) and *Viewing Your Work*.

### Saving the Session File

The changes you make in any task or operation are stored in a session file (.ses) when you save your work. Many tasks on the **Tasks** menu are not available until you have defined and saved your workspace. For more information, see *Managing Sessions* (on page 34).

### Access Permissions

 The left-most control on the main toolbar is the **Active Permission Group** box, which allows you to set the permission group for the objects you are creating or editing. The drop-down list contains all of the permission groups to which you belong. You can perform specified functions, depending on your access permissions. For more information, see *Permissions Overview* (on page 30).

### Locate Filter

You can use locate filters in the software to assist in selection of objects in the workspace. The **Locate Filter** box on the main toolbar displays the active filter. For more information, see *Locate Filter* (on page 156).



### Main Toolbar

The main toolbar in each task displays horizontally at the top of the page and contains the same controls and buttons—regardless of the active task.



	New - Creates a new session based on a template. For more information, see <i>New</i> (on page 41).
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	<b>Open</b> - Opens an existing session. If you have a session open when you click this command, you receive a message asking if you would like to save the changes to the active session. For more information, see <i>Open</i> (on page 43).
	<b>Save</b> - Saves the active workspace as a session (.ses) file with its currently defined name and location. For more information, see <i>Save</i> (on page 44).
	<b>Refresh Workspace</b> - Updates all the views in the workspace with the most current information from the database. Use this command to see changes that other users in your permission group have made to objects visible in your workspace, such as repositioning of equipment or adding new objects. You can press F5 to refresh your workspace. For more information, see <i>Refresh Workspace</i> (on page 52).
	<b>Copy</b> - Copies selected objects and their associated relationships to the Clipboard. The copied objects replace the previous contents of the Clipboard. For more information, see <i>Copy</i> (on page 137).
	<b>Paste</b> - Inserts the Clipboard contents in a selected document or a selected area of the model. For more information, see <i>Paste</i> (on page 138).
	<b>Delete</b> - Removes the selected object from the database and deletes any relationships and notes placed on the object. For more information, see <i>Delete</i> (on page 157).
	<b>Move</b> - Moves objects from one location to another. You specify the original location of the object and then indicate the destination location. For more information, see <i>Move</i> (on page 157).
	<b>Rotate Object</b> - Rotates or turns selected objects after the initial placement of the objects. For precision needs, you can define the angle and an incremental step value. For more information, see <i>Rotate Object</i> (on page 163).
	<b>Undo</b> - Reverses all changes of your transactions on information in the model database. This command does not affect data stored in your session file. For example, it does not undo view manipulation commands such as a fit, zoom, or pan. For more information, see <i>Undo</i> (on page 135).
	<b>Pin Point</b> - Helps you move, place, or modify objects with precision by displaying coordinate data at the pointer. When you turn <b>PinPoint</b> on, the <b>PinPoint</b> ribbon displays coordinates relative to a target position you set. You can reset the target position at any time. For more information, see <i>PinPoint</i> (on page 387).
	<b>SmartSketch 3D Toolbar</b> - Displays a floating toolbar of SmartSketch options. You can click the options to turn them on and off as you make selections in the graphic view for other commands. For more information, see <i>SmartSketch Options</i> (on page 398).
	<b>Add to SmartSketch List</b> - Adds an object that you select to the locate list of SmartSketch 3D. For more information, see <i>Add to SmartSketch List</i> (on page 400).

	<b>Point Along</b> - Helps you insert objects at specific locations along a path. A path can be along a pipe, duct, cableway, or the intersection line between two surfaces. For more information, see <i>Point Along</i> (on page 409).
	<b>Measure</b> - Measures distances and angles between objects in the model, including edges, faces, and key points. For more information, see <i>Measure</i> (on page 411).
	<b>Clip by Object</b> - Isolates an object or group of objects in your model for closer viewing or more detailed work. For more information, see <i>Clip by Object</i> (on page 187).
	<b>Clip by Volume or Plane</b> - Sets the view clipping volume. The software hides all objects not inside the clipped area. This command also lets you edit the clipped volume by dragging clipping planes in a graphic view. For more information, see <i>Clip by Volume or Plane</i> (on page 189).
	<b>Clear View Clipping</b> - Restores the view to its original state. Any objects hidden by clipping redisplay. This command displays any objects in the view that were hidden by the <b>Clip by Volume or Clip by Object</b> commands. Use this command to restore the view before you define a new clipping volume or object. For more information, see <i>Clear Clipping</i> (on page 197).
	<b>Active View Control</b> - Provides a separate graphic view and methods to control the camera/eye point position and the clipping of the active graphic view window. For more information, see <i>Active View Control</i> (on page 198).
	<b>Common Views</b> - Displays a two-dimensional or isometric orientation of objects in the active view. For more information, see <i>Common Views</i> (on page 203).
	<b>View by Points</b> - Provides options for specifying the view plane by three points or along a line. For more information, see <i>View by Points</i> (on page 204).
	<b>Rotate View</b> - Rotates or turns a view freely about a point or about an axis parallel to one of the axes in the global coordinate system. For more information, see <i>Rotate View</i> (on page 207).
	<b>Named Views</b> - Assigns a name and description to a view so you can apply the settings later to the active window. For more information, see <i>Named Views</i> (on page 201).
	<b>Zoom Tool</b> - Increases or decreases the display size of objects in the model. You can zoom in to get a closer view of an object or zoom out to see more of the model at a reduced size. You can use the mouse scroll wheel to zoom in and out and to pan at any time without having to select this command. For more information, see <i>Zoom Tool</i> (on page 212).
	<b>Navigate View</b> - Starts 3D navigation in the active window allowing you to fly around the model in a fluid, multi-directional motion. For more information, see <i>Navigate View</i> (on page 212).

	<b>Zoom Area</b> - Magnifies an area of the model. Click and drag to create a fence around an object or area of the model that you want to enlarge. For more information, see <i>Zoom Area</i> (on page 230).
	<b>Fit</b> - Fits all visible or selected objects in the active view. If you select one or more objects before clicking <b>Fit</b> , the software fits only the selected objects in the view. However, if you do not select any objects, then all visible objects in the clipping volume display in the view. For more information, see <i>Fit</i> (on page 231).
	<b>Pan</b> - Moves the view up, down, left, or right to let you see other areas of the model. The pointer displays as a hand when this command is active. For more information, see <i>Pan</i> (on page 231).
	<b>Center View by Object</b> - Centers a view based on a given point or object. For more information, see <i>Center View by Object</i> (on page 231).

## SECTION 2

# Best Practices

You might encounter situations where you do not know the best technique for using views, styles, and aspects. The following best practices guide you through these processes. Because your modeling environment is unique, specific instructions are not possible. However, enough detail is provided so that you can work through the solutions.

### ***In This Section***

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## Using multiple graphics windows

Consider setting up multiple graphics windows for the following situations:

- You need to see both a detailed view and the context for that view in the larger model.
- You need to see things from multiple orientations.
- You need to be able to rotate the display of objects. This is usually easier to do with a smaller, clipped view.

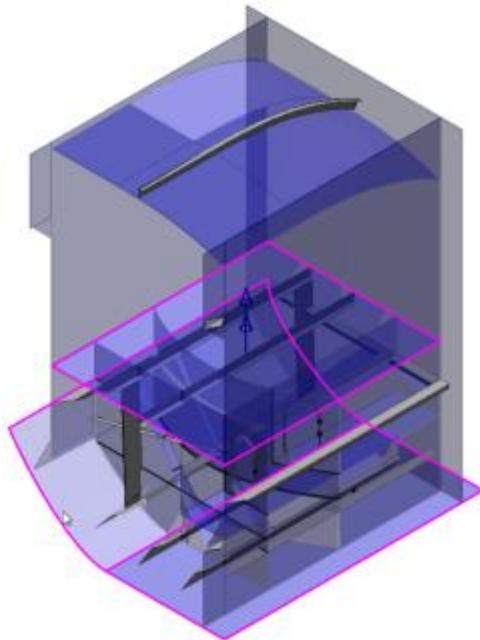
## Using clipping

You can use clipping planes to focus your view on specific objects in the model. The following procedure displays figures from an example model.

**NOTE** Rotating the display of a clipped view rotates about the center of that clipping volume. Because of this, objects are less likely to rotate out of the display area. Unclipped volumes rotate the entire model, which can cause unexpected results.

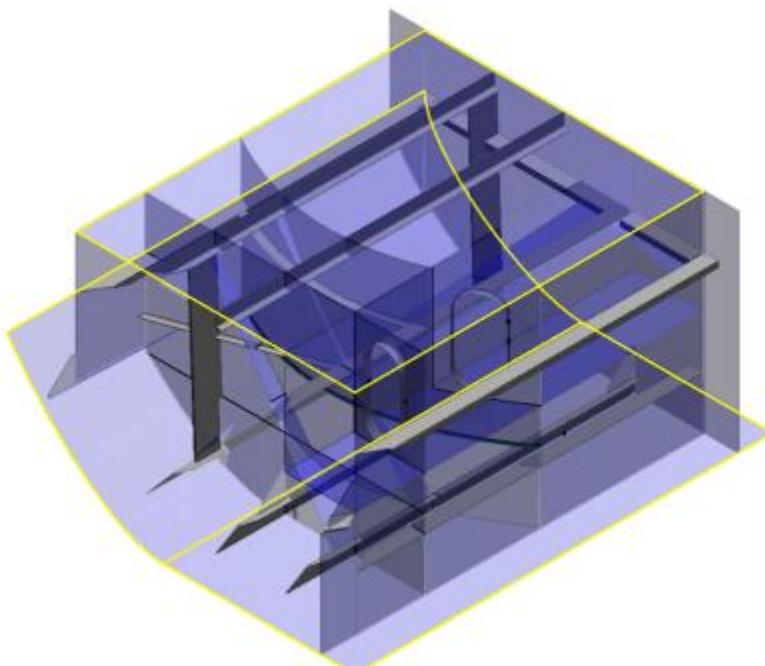
### Set the clipping volume

1. Select objects that represents the limits of the area to display.



2. Click **Clip by Object** .

*The objects within the volume defined by the selected objects display.*



For more information, see *Clip by Object* (on page 187).

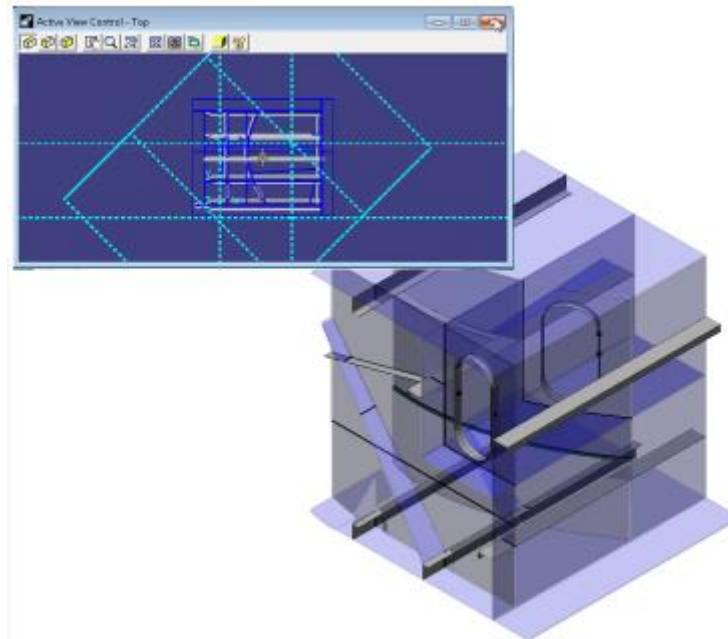
### Modify the clipping volume using the Active View Control

1. Click **Active View Control** .

*The Active View Control dialog box displays.*

**TIP** You must establish the clipping planes before using **Active View Control**  to display the clipping planes on the **Active View Control** dialog box.

2. Drag the clipping planes to display the correct volume.



For more information, see *Active View Control* (on page 198).

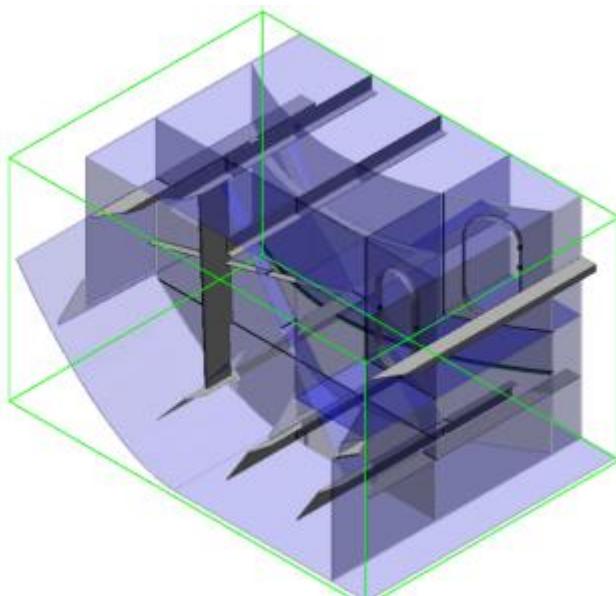
### Modify the clipping volume using Clip by Volume or Plane

1. Click **Clip by Volume or Plane** .

*If you have established the clipping planes, they display in the model. Otherwise, you must provide points to establish the clipping volume.*

---

2. Drag the clipping planes to display the correct volume.



**TIP** You can also use **QuickPick** to position the clipping planes.

For more information, see *Clip by Volume or Plane* (on page 189).

## Saving views

Saving a view allows you to quickly restore your display with your specified zoom and clipping settings. Named views are saved in the session file. For more information, see *Named Views* (on page 201).

### Saving a named view

1. Click a view to make it active.
2. Click **View > Named Views**.
3. In the blank line indicated by an asterisk, type a name and description for the saved view.

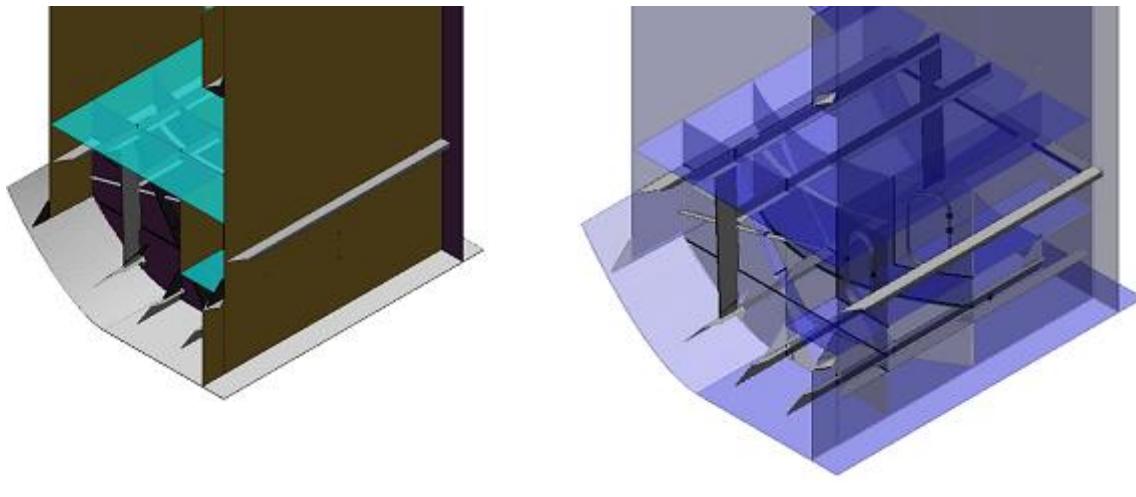
### Displaying a named view

1. Click any view.
2. Click **View > Named Views**.
3. Click a saved view to recall.
4. Click **Apply**.

*The named view displays in the selected window.*

## Using transparent styles

Transparent styles allow you to see more of the detail in your model without zooming in. This is particularly helpful when you have a lot of objects in the graphics area.



**Default style**

**Translucent style**

For more information, see *Surface Style Rules* (on page 323).

1. Click **Format > Surface Style Rules**.  
*The **Surface Style Rules** dialog box displays.*
2. Select the style rule to use. You can modify an existing rule, or create a new one.  
*The **Surface Style Rule Properties** dialog box displays.*
3. Name the style rule, if necessary.
4. Select a filter that meets your needs.
5. Select a translucent style from the **Style applied** list.
6. Click **Properties** next to the **Style applied** list.  
*The **Modify Style** dialog box displays.*
7. Change the **Opacity** box to **0.25**.
8. Click **OK** on the **Modify Style** dialog box.  
**TIP** Changing the style changes the display for everyone using the model.
9. In the **Select all aspects to which the style will be applied** list, select the boxes for the aspects to display in the transparent style.  
**TIP** The more aspects you select, the larger the session file becomes.
10. Click **OK** on the **Surface Style Rule Properties** dialog box.
11. Select the style rule that you modified from the **Style rule library** list on the **Surface Style Rules** dialog box, and then click **Add**.
12. Click **OK**.

*The parts that meet your filter display in the translucent color.*

## Using system folders to manage styles

You can use system folders to simplify the use of styles and make it easier to focus on the objects that you are working on. Create system folders for the types of objects that you want to display using a specific style. For example, you could have a folder for all of the structure objects. Assign a view style to that folder, and then all structure created within that folder will display using that style. For more information, see *Surface Style Rules* (on page 323).

1. Create the system folders in the Workspace Explorer to meet your needs.
2. Click **Format > Surface Style Rules**.
3. Click **New**.
4. Type a name for the rule in the **Rule name** box.
5. Select **Create New Filter** from the **Filter** list.
6. Type a name for the filter in the **Name** box.
7. Click the **System** tab.
8. Select the system folder.
9. Click **OK** on the **New Filter Properties** dialog box.
10. Select the style to apply from the **Style applied** list.
11. If necessary, click **Properties** next to the **Style applied** list, and adjust the style properties.
12. Click **OK** on the **Surface Style Rule Properties** dialog box.
13. Select the style rule that you created from the **Style rule library** list.
14. Click **Add**.
15. Click **OK** on the **Surface Style Rules** dialog box.
16. Create the object in the appropriate system folders.

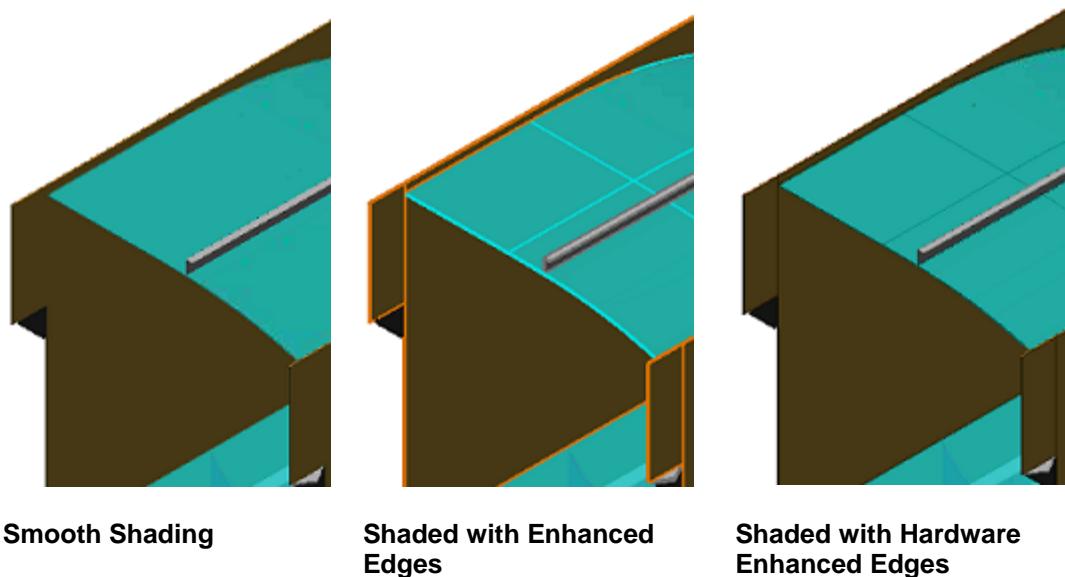
*The objects display using the view style assigned to the folder.*

## Using surface style rules

You can use surface style rules to apply a visual style to objects found by a filter. There is a library of filters delivered with Smart 3D. For more information on surface style rules, see *Surface Style Rules* (on page 323).

## Using enhanced edges render modes

Using enhanced edges makes it easier to see similar objects that overlap.



**Smooth Shading**

**Shaded with Enhanced Edges**

**Shaded with Hardware Enhanced Edges**

For more information, see *Format View* (on page 296).

1. Click **Format > View**.  
*The Format View dialog box displays.*
2. Select the type of shading to use from the **Render Mode** list.
3. Click **OK**.

### NOTES

- **Shaded with Enhanced Edges** uses software to create the enhancement. Models may take longer to refresh with this option.
- **Shaded with Hardware Enhanced Edges** refreshes more quickly. This option is only available if your graphics card supports it.

## Changing default colors

Changing the default background color may make it easier to find objects in your model. For more information, see *Options* (on page 504).

1. Click **Tools > Options**.

*The **Options** dialog box displays.*

2. Click the **Colors** tab.
3. Select a color from the **Background** list.
4. Select a color with sufficient contrast to the **Background** color from the **Handle** list.  
**TIP** The software uses the **Handle** color for glyphs. If the **Handle** color does not have sufficient contrast to the **Background** color, the glyphs can be difficult to see.
5. Click **OK**.

## Using the Reference Geometry aspect

You can turn the display of certain objects, such as reference curves, on and off by controlling the display of the Reference Geometry aspect. For more information, see *Format View* (on page 296).

1. Click **Format > View**.

*The **Format View** dialog box displays.*

2. Select **Reference Geometry** from the **Selected Aspects** list to turn off the display of the objects included in that aspect.

## SECTION 3

# Permissions Overview

A site administrator can configure permission groups and levels of access in Project Management (**Start > Intergraph Smart 3D > Project Management**). Your assigned permission group, and your level of access (**Read**, **Write**, or **Full Control**) in that permission group, defines the actions that are available to you when working with the software. The following list shows some of the actions that permission groups affect:

- Creating objects
- Modifying objects
- Deleting objects
- Accessing menu commands
- Changing properties of objects
- Pasting and restoring objects from a backup
- Claiming objects
- Creating relationships between objects

Consider the following example of interaction between permission groups and your work to modify the model.

- The **My Filters** folder is assigned to **Permission Group One** with **Full Control** access; however, unannounced to you, access to **Permission Group One** is changed to **Read Only**.
- Create a filter called **Surface Style Rule Two** in the **My Filters** folder.
- Click **Format > Surface Style Rules** to assign this surface style rule.
- Select **Surface Style Rule Two**, and click **Copy**.
- Click **Paste** to add the rule; however, the software displays the following message: **You do not have permissions to access this object**.

You cannot successfully complete the filter command because **Permission Group One**, which contains **Surface Style Rule Two**, now has **Read Only** access and does not allow you to add the rule.

Another example involves access to systems in the software. When you create a piping run, you must have **Write** access to the pipeline system parent.

## Approval Status of Objects

In addition to permission groups, the approval status of an object controls change during the phases of a project. The approval status for an object can range from **Working**, **In Review**, **Rejected**, or **Approved**. For example, in the Drawings and Reports task, or through the **Tools > Drawing Console** command, you can specify the propagation of properties down the hierarchy, from parents to children. However, if any of the objects in the hierarchy are set to **Approved** status, the properties are not propagated. Likewise, objects set to **Approved** status cannot be

deleted or updated. For example, if an isometric drawing is approved, you cannot re-extract the drawing from the model.

### NOTES

- You can change the permission group for an object only if you have **Write** access to that permission group and to the permission group in which you plan to place the object. The permission group is set on the **Configuration** tab of the **Properties** dialog box for an object.
- The **Active Permission Group** box on the main toolbar allows you to change the permission group when you are placing or editing objects in the model. The list contains all of the permission groups to which you belong.



### See Also

*Checking Interferences* (on page 421)  
*Permission Groups and Routing* (on page 31)  
*Select by Filter* (on page 354)  
*Surface Style Rules* (on page 323)

## Permission Groups and Routing

Several different users in different permission groups can work together when routing if you know how the software handles the different situations. Piping fully supports different users who have different sets of privileges and work on different runs, such as when working in a Global Workshare Configuration.

The software creates an Intermediate End Feature (IEF) at the end of a pipe run connected to another pipe run and creates a logical connection between the two IEFs/runs. The legs stop at the IEF and are not shared between pipe runs. You do not need to create a separate permission group for the pipe run or the pipe run features. All piping objects can be in the same permission group.

### Assignment of Permission Groups

Permission groups are assigned as follows:

- Objects that you create directly are assigned to the active permission group.
- Objects the software creates are automatically assigned a permission group determined by an internal set of rules. The permission group assigned is not necessarily the active permission group. Examples of automatically placed objects include connections and a pipe automatically inserted when two touching valves are separated.
- Parts generated by features are assigned the permission group of the parent feature; however, runs can be in a different permission group than their collective features and parts.
- End features use the permission group of the run to which they belong.
- Connections use the permission group of the parts to which they are connected. If the connection is between parts with different permission groups, the permission group to which you have write access is used. If the connection is between an equipment nozzle and a route part, the route part permission group is used for the connection.
- Piping connection objects (such as welds, bolt sets, gaskets, and clamps) use the permission group of the connection that generated the object.

## Systems and Permission Groups

A system is a logical grouping of sub-systems. When you add or remove a sub-system, you also modify the parent system definition. Therefore, you must have write access to the parent system. You do not need write access to the grandparent system. For example, to create a pipe run, you need write access to the parent pipeline. However, you do not need access to the system to which the pipeline belongs.

When participating in a Global Workshare Configuration, you must manage all permission groups at the host site. The sub-system requirement for write access to the parent system is not possible if the sub-system's permission group is created at the satellite site and the parent system's permission group is created at the host site.

For example, your host site is Houston and your satellite site is London. You create a system called *Pipe Rack 100* and its controlling permission group is in Houston. You assign write access to a user who works in London. During the workshare replication process, the *Pipe Rack 100* system and permission group are duplicated in London. The user in London can add objects such as columns, beams, and braces to the *Pipe Rack 100* system because you gave that user write access to the system's permission group in Houston. The London user cannot delete or change any of the properties of the *Pipe Rack 100* system in London because the host site, Houston, owns it. He can only add objects to the system. If the London user travels to Houston and logs on there, that user can delete or change any of the properties of the *Pipe Rack 100* system because the Houston host site owns it.

## Example Configuration A

In this example, two users, John and Peter, are working on the same run with exclusive access. John is responsible for part of the run, and Peter is responsible for the other part of the run. Neither John nor Peter should be able to modify the work of the other person.

The administrator should configure the permission groups as follows:

- Create three different permission groups: **PG-Run**, **PG-John**, and **PG-Peter**.
- Both John and Peter should have full control access to **PG-Run**.
- John should have full control access to **PG-John** while Peter should have read-only access to **PG-John**.
- Peter should have full control access to **PG-Peter** while John should have read-only access to **PG-Peter**.

The run should be created using the **PG-Run** permission group. When John works on his parts of the run, he should use **PG-John** as the active permission group. When Peter works on his parts of the run, he should use **PG-Peter** as the active permission group. The two halves of the run should connect at a component such as a valve (piping) or a union (electrical).

For example, John routes his part of the run, places a flange, and then places a gate valve. Peter then places a flange manually connecting to the open port of the gate valve, and then continues his part of the run.

## Example Configuration B

In this example, two users, John and Peter, are working on different but in-line connected runs with exclusive access. For example, John places an elbow, a straight piece, and a union, then stops. Peter connects to the open port of the union, and then continues routing. The administrator should configure the permission groups as follows:

- Create two different permission groups: **PG-John** and **PG-Peter**.
- John should have full control access to **PG-John** while Peter should have read-only access to **PG-John**.
- Peter should have full control access to **PG-Peter** while John should have read-only access to **PG-Peter**.

John should create the run using the **PG-John** permission group and route his part of the run. When Peter works on his part of the run, he should use **PG-Peter** as the active permission group. The Intermediate End Features will handle the connection between the two parts of the run.

### Example Configuration C

In this example, two users, John and Peter, are working on different runs connected by branching components such as a tee. The administrator should configure the permission groups as follows:

- Create two permission groups: **PG-John** and **PG-Peter**.
- John should have full control access to **PG-John**; Peter should have read-only access to **PG-John**.
- Peter should have full control access to **PG-Peter**; John should have read-only access to **PG-Peter**.

John creates an initial header run using **PG-John** as the active permission group and routes it as needed. Peter now wants to branch from John's run. Peter sets **PG-Peter** as the active permission group and selects the header in John's run from which to branch. Instead of creating the header component (such as a tee), the software generates a **To Do List** item for John.

When John updates the out-of-date **To Do List** item, the software modifies the header to add the tee, and then generates a **To Do List** item for Peter.

When Peter updates his out-of-date **To Do List** item, the software fixes the branch leg (the end of the branch leg is adjusted to the tee port). This is called a double hand-shaking mechanism.

### Example Configuration D

In this example, an administrator has created two separate Windows® Active Directory groups, each with different permissions, under the model.

- The first Windows® Active Directory group, Group A, has been assigned write privileges to the permission group, **PG-1**. A user, John, is a member of this group.
- The second Windows® Active Directory group, Group B, has been assigned read-only access privileges to **PG-1**. John is also a member of this group.
- Because John is a member of Group A, which has write privileges, John therefore has write privileges to **PG-1**.

## SECTION 4

# File Menu

The **File** menu provides commands for managing session files, updating and defining the workspace, printing, importing, and exporting. Some of the commands on this menu may change depending on the active task. The **Most Recent File** list at the bottom of the menu provides quick access to the session files you use most.

### In This Section

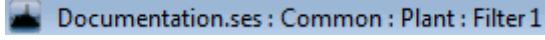
Managing Sessions .....	34
Define Workspace .....	45
Importing and Exporting Data.....	53
Print.....	132
Most Recently Used List.....	134
Exit.....	134

## Managing Sessions

Each time you use the software, you use a session that allows you to save certain properties, such as window size, layout, and view orientation from one work session to the next. One of the settings saved in the session is the workspace. During a session, you define a workspace to view and work with certain objects in the model data. Defining a workspace also allows you to create and name filters that restrict the data of the entire model into more manageable subsets.

Therefore, we recommend that you save your session and use this saved session to open your model in Smart 3D. This practice saves you the effort of defining your workspace from scratch. You need only use the **Refresh Workspace**  command to update all the views in the workspace with the most current information from the database.

The name of the current session file appears in the title bar of the application, along with the name of the task, Model, and active filter. You can also see this information on the Windows task bar. This information is helpful when multiple instances of the software are running, such as during a Paste and Restore operation.



The workspace you define appears in the **Workspace Explorer**, which allows you to move throughout the hierarchy of your workspace. You can view the workspace using the **System**, **Assembly**, **Space**, **WBS** (Work Breakdown Structure), **Analysis**, **Reference**, and **Reference 3D** views. Each view corresponds to a tab at the bottom of the **Workspace Explorer**. You can use the **Tools > Options** command to specify the tabs to show in the **Workspace Explorer**. For more information, see *Change the Displayed Workspace Explorer Tabs* (on page 506).

Whenever you create a new session, you are working with templates. In this context, a template is a standard Workspace file that you have placed in the Templates folder; you use a template as a pattern to assemble the parameters you want for a new work session.

The **New** command creates a new session using any of the available templates. Three standard templates are delivered with the application: **Empty**, **English Units**, and **Metric Units**. These templates are in the *[Product Folder]\CommonApp\SessionTemplates* folder.

You have the option to modify any template to satisfy specific requirements for a site. You can create a new template by copying one of the delivered templates and renaming it. Then, open the copied template in the software to specify the views, styles, and other properties.

When the **New** dialog box appears, the **Empty** template is selected by default. By storing the default templates for these session files in sub-directories, the software can supply named tabs on the **New** dialog box. This dialog box can expand to accommodate multiple tiers of tabs as necessary for particular model configurations.

Optionally, you can determine a default selection or configuration. Using multiple tabs, each tab on the **New** dialog box has a unique **Empty** template and other tab-specific templates for the environment. Template files do not have a special extension. They are regular workspace documents you have placed in the proper folder on your system.

The **Open** dialog box allows you to access any saved session to continue working, to make changes, or to review completed work. Indicate the location in which you want to find an existing session using the **Look in** list. If necessary, filter the displayed files using the **Files of type** list. Then, select the file you want to open in the file list and click **Open**.

 **NOTE** You can receive context-sensitive information about commands and dialog boxes by pressing **F1**.

### See Also

*Create a new session* (on page 41)

*Create a session template* (on page 42)

*Define a workspace using a new filter* (on page 46)

*Define a Workspace Using an Available Filter* (on page 47)

*Open* (on page 43)

## Session Files Best Practices

Use the following best practices when working with session files.

### Save Session Files

- After restoring new databases from a backup, open the model, make necessary setting changes, and save new session files.
- Save a session file after making significant changes, such as splitting blocks and detailing structure. This minimizes the refresh time the next time you open the model from the session file.
- You cannot save a session file if you run out of memory or the session terminates abnormally. Re-open the session file and refresh the workspace to restore. If new objects are not defined in a filter, browse the database and add the objects to the filter.

### Global Workshare

- When working in a global workshare environment, refresh the workspace after opening a session file.

## Share Session Files

When sharing a session file, define the session file with catalog or model filters. You must have appropriate permissions to create or modify catalog filters and model filters. For more information, see *Permission Group Tab (Filter Properties Dialog Box)* (on page 372) and *Permissions Overview* (on page 30).

- Catalog filters are used like reference data in the catalog. A catalog filter applies to company-wide operations. For example, your administrator can define filters such as Company\_Filter\_1, Company\_Filter\_2.
- Model filters are available to all users assigned to a specific database model.
- Delivered catalog filters query different types of model objects.
- Filters created under **My Filters** are not available to other users.
- You must have appropriate privileges to create, edit, or delete model and catalog filters.

**★IMPORTANT** Do not create model filters at a satellite site.

## Attributes Saved in a Session File

When you create and save a session file, the settings made using the commands listed below are saved as the default values. These are available the next time you open the session file. The settings are listed and organized based on Smart 3D tasks.

### Compartmentation

- **Place Volume by Two Points Command**

Place Volume By Two Points Ribbon options:

- **Type**
- **Select Volume (Addition or Subtraction)**
- **Volume list**

Compartment Properties Dialog Box settings:

- **General tab**

- **Create Imported Volume Command**

Create Imported Volume Ribbon options:

- **Type**
- **Volume list**
- **Select the File**

Compartment Properties Dialog Box settings:

- **General tab**

- **Place Volume along Path Command**

Place Volume Along Path Ribbon options:

- **Type**
- **Volume list**

Compartment Properties Dialog Box settings:

- **General tab**
- **Cross-Section tab**
- **Create Volume by Faces Command**

Create Volume by Faces Ribbon options:

- **Type**
- **Volume list**
- **Face**
- **Plate Filter**

Compartment Properties Dialog Box settings:

- **General tab**
- **Create Multiple Volumes Command**

Create Multiple Volumes Ribbon options:

- **Type**
- **Face**
- **Plate Filter**
- **Bound**

Compartment Properties Dialog Box settings:

- **General tab**
- **Bound by Volumes Command**

Bound by Volumes Ribbon options:

- **Type**
- **Operand list**

Compartment Properties Dialog Box settings:

- **General tab**
- **Merge Volumes Command**

Compartment Properties Dialog Box settings:

- **General tab**
- **Create Load Combination Command**

Create Load Combination Ribbon options:

- **Type**
- **Load list**

Spatial Load Combination Properties Dialog Box

- **Load General tab**

- **Create Spatial Load Command**

Create Spatial Load Ribbon options:

- **Type**

Spatial Load Properties Dialog Box settings:

- **Load General tab**

- **Create Unit Load Command**

Create Unit Load Ribbon options:

- **Type**

Spatial Load Properties Dialog Box settings:

- **Load General tab**

- **Export Compartment Command**

- **Compart Query Service Command**

Compart Query Service Ribbon

- **Save**

## Planning

- **Split Planning Joint Command**

Split Planning Joint Ribbon options:

- **Offset**

- **New (Block) Assembly Command**

Assembly Properties Dialog Box settings:

- **General tab**

**Block Properties Dialog Box settings:**

- **General tab**

## Structural Manufacturing

- **Connect Fabrication Margin Command**

Connect Fabrication Margin Ribbon options:

- **Connected Part Filter**
- **Part Filter**
- **Rule**
- **Type**
- **Value**

Fabrication Margin Properties Dialog Box settings:

- **General tab:**

- **Margin Rule**

- **Type**
- **Value**
- **Active Fabrication Margin Command**

Fabrication Margin Ribbon options:

- **Part Filter**
- **Rule**
- **Mode**
- **Type**
- **Value**
- **Start**
- **End**

Fabrication Margin Properties Dialog Box settings:

- **General tab:**
  - **Margin Rule**
  - **Mode**
  - **Type**
  - **Value**
  - **Start**
  - **End**
- **Shrinkage Command**

Shrinkage Ribbon options:

- **Rule**
- **Shrinkage Type**
- **Primary Factor Control**
- **Secondary Factor**

Shrinkage Properties Dialog Box settings:

- **General tab:**
  - **Shrinkage Rule**
  - **Shrinkage Type**
  - **Primary Factor Control**
  - **Secondary Factor**
- **Pin Jig Command**

Pin Jig Ribbon options:

- **Balance Method**
- **Minimum Pin Height**

- **Move**
  - **Horizontal Offset**
  - **Vertical Offset**
- **Rotate**
  - **Angle**
- **Add Pin**
  - **Horizontal Offset**
  - **Vertical Offset**
- **Add Pins**
  - **Offset**
- **Part Monitor Command**

Part Monitor Ribbon options:

  - **View**
  - **Viewer**
    - **Text Format**
    - **Template**
    - **Output Format**
- **Manufacturing Service Manager Command**

Manufacturing Service Manager Ribbon options:

  - **Action**
  - **Report Per**
  - **Filter**
  - **Connected**

Selection of Possible Report Data Dialog Box settings:

  - **Settings tab:**
    - **Only include Out of Date manufacturing objects**
    - **Only include manufacturing objects In To Do list**
    - **Check detailed part in To Do list**
    - **Refresh After Update**
    - **Highlight Out of Date objects**
    - **Update objects with detailed part in To Do list**

## New

- Creates a new session based on a template.

### NOTES

- You can choose from any of the standard templates or any custom templates created for your site. Standard templates include the default **Empty** template, the **English Units** template, and the **Metric Units** template.
- The delivered Nominal Piping Diameter (NPD) default unit in both English and Metric templates is Native (fractional). The NPD unit default is mm (millimeters) with precision set to zero.

### [New Dialog Box \(on page 42\)](#)

---

#### What do you want to do?

- Create a new session (on page 41)*
- Create a session template (on page 42)*

---

#### Create a new session

- Click **File > New**.

*New Dialog Box (on page 42)*

- On a tab, select a template. You can choose among the standard templates (**Empty**, **English Units**, or **Metric Units**) or a custom template you defined previously.

### NOTES

- The **Workspace Templates** path is specified on the **File Locations** tab of the **Tools > Options** dialog box. If the path includes subfolders within a hierarchy, the name of each subfolder appears as a separate tab on the **New** dialog box. For example, you can have tabs named by project or by task.
- The delivered NPD default unit in both English and Metric templates is Native (fractional). Also, the NPD unit default is mm (millimeters) with precision set to zero.

- Click **OK**.

- If you select the **Empty** template, click **Tasks > Configure Task List** to configure the task list to meet your needs. If you selected another template, you do not need to perform this step.

*Configure Tasks (on page 611)*

- Click **File > Define Workspace**.

**TIP** The shortcut key for the **Define Workspace** command is CTRL+W.

- In the **Model** list, select the name of the Model database.
- In the **Filter** list, select an existing filter or create a new one.
- Click **OK**.

9. Click **File > Save** to save the new session.
10. Type a name for the session file.
11. Define a location where you want to save the file.
12. Click **Save**.

 **NOTE** The software names your new session **Untitled** by default until you save the new session and assign it a new name.

## Create a session template

You can create a session template based on any of the standard templates delivered with the application or a custom template you defined previously.

1. Click **File > New**.  
*New Dialog Box (on page 42)*
2. On a tab, select a template. You can choose among the standard templates (**Empty**, **English Units**, or **Metric Units**) or a custom template you defined previously.
3. Click **OK**.
4. Specify the views, styles, and other properties that satisfy specific requirements for a site.
5. Click **File > Save As**.
6. Browse to the template folder.

### NOTES

- The **Workspace Templates** path is specified on the **File Locations** tab of the **Tools > Options** dialog box. The default location is *[Product Folder]\CommonApp\SessionTemplates*.
- You can store the session templates in subfolders within the template folder. The software can supply named tabs on the **New** dialog box. If the path includes subfolders within a hierarchy, the name of each subfolder appears as a separate tab on the **New** dialog box. For example, you can have tabs named by project or by task. In this way, the **New** dialog box can expand to accommodate multiple tiers of tabs as necessary for particular product configurations.

7. In the **File name** box, specify the name of the session template.
8. Click **Save**.

## New Dialog Box

Specifies the path to the template you want to use to create a new session. You can select from the following templates:

- **Empty** - The default template without any stored units.
- **English Units** - Displays measurements using the English system.
- **Metric Units** - Displays measurements using the metric system.

The default locations for the templates are as follows:

#### General

Creates a new session using the **Empty** template.

#### Mine

Displays all available templates for creating a new session using the Mine mode. The available templates are **English Units** and **Metric Units**.

#### Plant

Displays all available templates for creating a new session using the Plant mode. The available templates are **English Units** and **Metric Units**.

#### Ship

Displays all available templates for creating a new session using the Ship mode. The available templates are **English Units** and **Metric Units**.

You can store templates in any location you want, but by default, the software looks for templates in the location designated for templates. You can designate a different location or custom path by clicking **Tools > Options** and selecting the **File Locations** tab.

The **Workspace Templates** path is specified on the **File Locations** tab of the **Tools > Options** dialog box. If the path includes subfolders within a hierarchy, the name of each subfolder displays as a separate tab on the **New** dialog box. For example, you could have tabs named by project or by task.

## Open

 Opens an existing session. If you have a session open when you click this command, you receive a message asking if you would like to save the changes to the active session.

The software examines the file permissions assigned to a session before it opens a session. If you do not have the necessary permissions to open a session, or if another user has the session opened exclusively, a warning message indicates why you cannot open the session.

1. Click **File > Open**.
2. Click **Yes** to save the current session, or click **No** to close the current session without saving.
3. In the **Look in** box, browse to locate a session.
4. Select a session to open.
5. Click **Open**.

#### NOTES

- You can also open a session file by double-clicking it, or right-click the session file and select **Open**.
- If the session connection fails, use the **Modify Database and Schema Location** utility to set the Site database and schema. Click **Start > All Programs > Intergraph Smart 3D > Database Tools > Modify Database and Schema Location**.

## Close

Closes the active session. If you have changed data since you last saved, or if you have not saved a new session, the software prompts you to save the file.

## Save

 Saves the active workspace as a session (.ses) file with its currently defined name and location. If you are saving the session for the first time, the **Save As** dialog box appears, so you can specify the location, which could be a local or network drive or a UNC path, as well as the name of the session. The software adds an .ses extension to the file name to indicate that it is a session file.

 **TIP** The shortcut key for the **Save** command is CTRL+S.

## Save As

Saves the active workspace session file with a different name or in a different location. A dialog box prompts you to specify the location, which could be a local or network drive or a UNC path, as well as the name of the session. The software saves all session files with an .ses extension added to the name. Saving your session file to the desktop creates a session icon that provides you with the fastest method for returning to your session.

### NOTES

- File names cannot contain the following characters: \, /, :, \*, ?, ", <, >, |
- If the session connection fails, use the **Modify Database and Schema Location** utility to set the Site database and schema. Click **Start > All Programs > Intergraph Smart 3D > Database Tools > Modify Database and Schema Location**.

## Properties (Session Files)

Accesses general information about the current session file. On the **General** tab, you can change the file properties. For example, you can remove the read-only property so that changes are possible.

## Send

Sends a session file to one or more recipients through your e-mail application. When you select the **Send** command, the software generates a new mail message and embeds your session document in the message as an attachment. You can then choose your recipients, add a descriptive phrase in the **Subject** box, and add text in the message area to accompany the attached session document as needed.

### NOTES

- For the **Send** command to work, you must first have a default e-mail client defined on your computer.
- The session document must have been saved at least once before it can be sent.

## Define Workspace

**File > Define Workspace** selects a model in which to work, a filter designed for that model, and a role. The filter and role retrieve from the database the objects that you want to appear in your workspace. For more information, see *Select by Filter* (on page 354). The shortcut key for **Define Workspace** is CTRL+W.

The first thing you must do after starting Smart 3D is to define the contents of your workspace. The workspace optimally contains only those objects that you want to work with from the database. Keeping an uncluttered workspace allows you to work faster.

You can also select a role to further refine the workspace filter and improve performance. Each role is defined with a set of disciplines and subclass object types. The role filter is applied to the workspace filter so that only the object types that are included in the selected role are brought into the workspace. Roles work across all object types.

### NOTES

- Selecting a role does not modify the workspace file definition. Commands that make use of the active workspace filter, such as **Snapshot View** (on page 457), continue to use the filter definition in the database.
- Roles and their included object classes and subclasses are defined in the OptimizationForRole.xml file in the *[Reference Data Folder]\SharedContent\XML* folder. If the file is missing, the **Define Workspace** dialog box does not display the **Role** box. Your administrator can customize OptimizationForRole.xml. For more information, see *Define roles* (on page 49). For more information, see *Define roles* (on page 49).

The software retrieves into your active session all objects that match the following criteria defined for the selected model:

- The filter for the model
- Optionally, the role that you are performing. The software removes specified object types not needed for workflows assigned to selected role.

When you save your session, the software stores your workspace definition so you will see the same data the next time you open the session.

Before loading the query results to your workspace, the software determines whether your computer has enough virtual memory to contain the results. If you do not have adequate memory available, the software displays a warning that your workspace size is likely to exceed the available memory of your computer. You can continue by clicking **Yes**. If you click **No**, the query load stops, and the **Define Workspace** dialog box returns so that you can redefine your search criteria.

**★IMPORTANT** Smart 3D supports the modeling of objects within a 100 km range (-50,000 meters to +50,000 meters along each axis) from the global coordinate system origin. However, due to the 32-bit precision limitations of graphic cards, objects modeled further than 10,000 meters (6.2 miles) of the global coordinate system might not display correctly when you zoom in (circular objects will appear distorted for example). If your model coordinate values are large (for example, E = 60,000, N = 55,000), to get the coordinate readout that you want, you should define a coordinate system at correspondingly large negative values (example, E = -60,000, N = -55,000). Then, use the coordinate system that you created as your active coordinate system for modeling and output. Do not bring this new coordinate system into your workspace.

---

### What do you want to do?

- [Define a workspace using a new filter \(on page 46\)](#)
- [Define a workspace using an available filter \(on page 47\)](#)

---

## Define a workspace using a new filter

Filters define the criteria for the objects included in a workspace. For more information on filters, see [Select by Filter \(on page 354\)](#).

1. Click **File > Define Workspace**, or press CTRL+W.
2. In the **Model** box, select the model in which you want to work.
3. Select **Create New Filter** in the **Filter** box.

**!TIP** Another method is selecting the **More** option in the **Filter** box, and then selecting **New Filter** from the **Select Filter** dialog box. For more information on creating new filters, see [Create a New Filter \(on page 359\)](#).

4. Type a name for the new filter in the **Name** box on the **New Filter** dialog box. The filter name can be any number of alphanumeric characters including blanks, but the name must be unique in the Model database. Filter names cannot include apostrophes.
5. Specify the filter search properties by using one or more of the properties tabs.
6. If you want your search to include nested objects, select the **Include nested objects** option.
7. After defining the filter, click **OK**.
8. Select a role from the list in the **Role** box.

**NOTE** Roles and their included object classes and subclasses are defined in the OptimizationForRole.xml file in the *[Reference Data Folder]\SharedContent\XML* folder. If the file is missing, the **Define Workspace** dialog box does not display the **Role** box. Your administrator can customize OptimizationForRole.xml. For more information, see [Define roles \(on page 49\)](#).

9. Click **OK**.

*The workspace refreshes with the new filter definition objects. Any objects in the current select set are removed if they are no longer part of the workspace. Any objects remaining in the select set are in modify mode.*

### NOTES

- If the **Database Detect** option is running for the selected model, the filter automatically includes all the associated interferences for the objects in the **Workspace Explorer** (although interferences are not included for the filter). For more information, see [Checking Interferences \(on page 421\)](#).
- Before loading the query results to your workspace, the software determines whether your computer has enough virtual memory to contain the results. If you do not have adequate memory available, the software displays a warning that your workspace size is likely to exceed the available memory of your computer. It then asks if you want to continue. If you want to continue anyway, click **Yes**. If you click **No**, the query load stops, and the **Define Workspace** dialog box returns so that you can refine your search criteria.

## Define a workspace using an available filter

1. Click **File > Define Workspace**, or press CTRL+W.
2. In the **Model** box, select the model in which you want to work.
3. Complete one of the following actions: (1) Select an existing filter that meets your search criteria from the list in the **Filter** box; or (2) Select the **More** option in the **Filter** box to view and select a filter from the other available filters.
4. Select a role from the list in the **Role** box.

**NOTE** Roles and their included object classes and subclasses are defined in the OptimizationForRole.xml file in the *[Reference Data Folder]\SharedContent\XML* folder. If the file is missing, the **Define Workspace** dialog box does not display the **Role** box. Your administrator can customize OptimizationForRole.xml. For more information, see *Define roles* (on page 49).

5. Click **OK**.

*The workspace refreshes with the new filter definition objects. Any objects in the current select set are removed if they are no longer part of the workspace. Any objects remaining in the select set are in modify mode.*

### NOTES

- The **Filter** box displays up to the last ten filters selected for the selected model. If the filter you want is not on this list, you can select the **More** option to display all the available filters. If you are the first person to define a workspace for this task, then no previous filters are listed in the **Filter** box. In this case, click the **More** option and select a filter in the tree view, or click the **Create New Filter** option to create a new one. For more information, see *Create a New Filter* (on page 359).
- When you save a session, the software saves the workspace definition.

## Define Workspace Dialog Box

Defines the workspace content using:

- The model in which you want to do your work
- A filter to retrieve objects for display in the workspace. For more information on filters, see *Select by Filter* (on page 354) in the *Common User's Guide*.
- A role which applies additional filter criteria. The filter excludes from the workspace objects not required by your functional discipline.

### Plant/Ship/MHE

Provides a list of the model databases for your site. Choose a model to work in from those listed in this box. If your site only has one Model database, then the software lists only one name. When you create a new Model database, it is added to the list. If you have multiple sites, only the models associated with the active site appear in the list.

### Filter

Displays a maximum of ten of the last filters selected for the workspace. This box is blank if no filters were previously defined and used.

If you select the **More** option, the **Select Filter** dialog box appears. This dialog box displays

a tree view of other filters you can select. For more information, see *Select Filter Dialog Box* (on page 366) in the *Common User's Guide*. The **Create New Filter** option opens the **Filter Properties** dialog box where you can create a new filter. The software places the resulting new filter in the **My Filters** folder. The software then returns to the **Define Workspace** dialog box where the new filter name is displayed. If your permissions include edit privileges, the **Define Workspace** dialog box also allows you to rename or delete filters and edit filter properties.

### Properties

Displays the **Filter Properties** dialog box that provides tabs of optional properties for the selected filter, or query criteria, you can select and apply to your filter. The **System**, **Assembly**, and **Named Space** tabs allow you to select large groups of objects in the database. If you want a more restricted selection, choose a tab such as **Permission Group** or **Object Type**. The **Permission Group** tab properties limit the selection to only those objects in a designated group. The **Object Type** tab displays a tree view of all objects in the system. The objects are organized primarily by the task where you created them. Using this tab restricts your selection to only those objects of the selected types. For more information, see *Filter Properties Dialog Box* (on page 368) in the *Common User's Guide*.

### Role

Provides a list of user roles that you can select for the workspace. You can define roles to suit the type of work you are performing, to reduce the number of model objects loaded into the workspace, to improve performance, and to load the optimal objects in your workspace. Reducing the number of objects loaded into the workspace improves performance by using less memory, reducing network traffic, and speeding workspace definition and refresh.

Each role defines a specific set of disciplines (class object types) and related subclass object types. If you select a role, only the object types defined for the role and meeting criteria of the selected **Filter** display in the workspace. Delivered roles include:

- None
- Civil Designer
- Electrical Designer
- Equipment Designer
- Hanger & Support Designer
- HVAC Designer
- Piping Designer (Aboveground)
- Piping Designer (Underground)
- Ship Early Designer
- Ship Detail Designer
- Ship Production Designer
- Structural Designer
- Plant Reviewer
- Ship Reviewer

Roles and their included object classes and subclasses are defined in the OptimizationForRole.xml file in the *[Reference Data Folder]\SharedContent\XML* folder. If

the file is missing, the **Define Workspace** dialog box does not display the **Role** box. Your administrator can customize OptimizationForRole.xml. For more information, see *Define roles* (on page 49).

### 💡 TIPS

- If you switch to a different task, you can also redefine your workspace to a new role to suit the new task. For example, if you change from **Tasks > Piping** to **Tasks > HVAC**, you can change **Role** from **Piping Designer (Aboveground)** to **HVAC Designer**.
- If you frequently switch tasks, your administrator can create a new role that includes objects for all used tasks.
- You can also save role-specific session files. For more information, see *Managing Sessions* (on page 34) in the *Common User's Guide*.

### 📝 NOTES

- The shortcut keys for the **Define Workspace** command are CTRL+W.
- You can also access the **Select Filter** dialog box by clicking **Tools > Select by Filter**.
- Before loading the query results to your workspace, the software determines whether your computer has enough virtual memory to contain the results. If you do not have adequate memory available, the software displays a warning that your workspace size is likely to exceed the available memory of your computer. You can continue by clicking **Yes**. If you click **No**, the query load stops, and the **Define Workspace** dialog box returns so that you can redefine your search criteria.

## Define roles

The list of roles for selection in the **Role** box in the **Define Workspace** dialog box of **File > Define Workspace** is defined in the OptimizationForRole.xml file in the *[Reference Data Folder]\SharedContent\XML* folder. Your administrator can customize OptimizationForRole.xml.

## Roles XML Format

```
<Smart3D>
  <Role Name="" StyleSet="" Version="">
    <Discipline ClassName="" />
    <Discipline ClassName="">
      <Node ClassName="" />
      <Node ClassName="">
        <Node ClassName="">
          </Node>
        </Node>
      </Discipline>
    </Role>
  </Smart3D>
```

The XML format defines three criteria in a hierarchy:

1. **Role** - The optimization category.

```
<Role Name=" " StyleSet=" " Version=" ">
```

**Name** - Defines the role name that displays in the **Define Workspace** dialog box **Role** list.

**StyleSet** - Defines the set of project colors and symbols (styles) used to display objects defined by the role.

**NOTE** The **StyleSet** names in OptimizationForRole.xml are placeholder values and have no effect on object styles. Style sets work with color configurations defined in the **Project Management** task, but no color configurations for role style sets are delivered with the software. Style sets require additional filtering of objects and can affect performance. For more information, see *Default Color Configuration Dialog Box* in the *Project Management User's Guide*. Contact Intergraph Support if you want to create style sets for roles.

2. **Discipline** - The top level of the object class to include in the role.

Use this format when you want to include all subclasses of the object class:

```
<Discipline ClassName=" " />
```

Use this format when you are also defining specific subclasses:

```
<Discipline ClassName=" ">...</Discipline>
```

3. **Node** - Individual subclasses to include under the object class. Use **Node** when you do not want to include all subclasses.

Use this format when you want to include all subclasses of the subclass:

```
<Node ClassName=" " />
```

Use this format when you are also defining specific subclasses of the subclass:

```
<Node ClassName=" ">...</Node>
```

## **NOTES**

- The **ClassName** attribute defines an object class or subclass name as it displays in the object hierarchy used in Smart 3D. You can see a tree view of the object hierarchy in the **Object Type** tab of the *Filter Properties Dialog Box* (on page 368).
- The software supports the nesting of three levels of **Node** classes.
- Roles applied to filters that include referenced files or referenced 3D files must include the specific reference classes to populate the **Workspace Explorer** tree view. If these classes are missing from the role definition, references are added by the filter but the **Workspace Explorer** cannot be populated. Examples include:

```
<Discipline ClassName="Reference 3d File"/>
<Discipline ClassName="Referenced File"/>
```

You can see all reference class names in the object hierarchy.

- The discipline and node names must match those defined in the Smart 3D object hierarchy. If in any of these names do not match an existing classification, an error message displays when the role filter is loaded. The software excludes the node in error from the workspace.

## Example Roles

```
<?xml version="1.0" encoding="windows-1252" ?>
<Smart3D>
  <Role Name="Electrical Designer" StyleSet="Electrical"
Version="1.0">
    <Discipline ClassName="Cableway">
      <Node ClassName="Cableway Features"/>
```

```

<Node ClassName="Cableways"/>
</Discipline>
<Discipline ClassName="Cabling">
    <Node ClassName="Cable Features"/>
    <Node ClassName="Cable Marker"/>
    <Node ClassName="Cable Runs"/>
</Discipline>
<Discipline ClassName="Equipment and Furnishing">
    <Node ClassName="Equipment">
        <Node ClassName="Equipment A"/>
    </Node>
</Discipline>
<Discipline ClassName="Supports"/>
</Role>
<Role Name="Equipment Designer" StyleSet = "Equipment" Version =
"1.0">
    <Discipline ClassName="Equipment and Furnishing" />
    <Discipline ClassName="Grid Systems"/>
    <Discipline ClassName="Structure">
        <Node ClassName="Equipment Foundations"/>
        <Node ClassName="Members"/>
        <Node ClassName="Slabs"/>
        <Node ClassName="Walls"/>
    </Discipline>
</Smart3D>

```

In the above example, two roles are defined:

<b>Role</b>	<b>Discipline</b>	<b>Object Types</b>
Electrical Designer	Cableway	Cableway Features Cableways
	Cabling	Cable Features Cable Marker Cable Runs
	Equipment and Furnishing	Equipment Equipment A
	Hangers and Supports	Supports
Equipment Designer	Equipment and Furnishing	All Equipment and Furnishing objects
	Grid Systems	All Grid objects
	Structure	Equipment Foundations Members Slabs Walls

## Refresh Workspace

 Updates all the views in the workspace with the most current information from the database. Use this command to see changes that other users in your permission group have made to objects visible in your workspace, such as repositioning of equipment or adding new objects. You can press F5 to refresh your workspace.

During the update, a small progress dialog box displays that allows you to cancel the update at any time before it is finished. If another command was active before you selected **Refresh Workspace**, the software stops the active command.

 **NOTE** You are prompted to refresh your workspace if you select an object that is visible in your workspace but another user has deleted from the model.

## Importing and Exporting Data

Use the **File > Import** commands to import data for Electrical, Equipment, HVAC, Piping, and Structure. The commands are similar for each task; however, Structure provides its own Import and Export commands for CIS/2 files. For more information, see *Import Structure* (on page 65) and *Export Structure* (on page 107).

You import data from XML files. The files are created in two ways - XML files generated using the PDS Model Data Exporter, or XML files that are written in XMpLant format. PDS Model Data Exporter exports PDS data into XML files in Intergraph Schema. XMpLant is an industry standard (ISO15926), neutral format that is used to import third-party software data.

### PDS Model Data Exporter

- Creates XML data that is compatible with the Intergraph (Ingr) schema.
- Mapping files for Intergraph schema XMLs are written in **Excel workbooks**.
- The PDS Model Data Exporter utility is delivered separately from Smart 3D.<sup>a</sup>

### XMpLant-formatted XML

- This XML corresponds with XMpLant schema.
- Mapping files for XMpLant schema XMLs are written in **XML format**.
- XMpLant Samples and XMPlant mapping files are delivered with Smart 3D for Piping, HVAC, Electrical, and Equipment.<sup>b</sup>

<sup>a</sup> In the delivered-sample mapping workbook, for example, ElectricalTranslationMap.xls, several sheets describe the mapping used for raceway, while the ConduitSpec sheet maps the XML conduit run specifications. The CabletraySpec sheet specifies the mapping of all the XML cableway specifications.

<sup>b</sup> Use the corresponding **Import** dialog boxes to browse for the XMPlant XMLs and their mapping files. The XMpLant mapping files to be used to import XMPlant XMLs for each discipline are listed below:

#### Electrical - [Product

*Folder]\Translators\ConfigurationFiles\XMpLantSP3DMaps\Electrical\SP3DXMpLantElectricMain.xml*

#### Equipment - [Product

*Folder]\Translators\ConfigurationFiles\XMpLantSP3DMaps\Equipment\SP3DXMpLantEquipmentMain.xml*

#### HVAC - [Product

*Folder]\Translators\ConfigurationFiles\XMpLantSP3DMaps\HVAC\SP3DXMpLantHVACMain.xml*

#### Piping - [Product

*Folder]\Translators\ConfigurationFiles\XMpLantSP3DMaps\Piping\Map\_XMpLant\_Sp3D\_Attributes.xml*

You can temporarily import geometry data in ACIS or IGES format from other software packages, such as Tribon, NAPA, or Rhino. You can compare the temporary geometry to the geometry of objects in the Model.

During the import process, the software applies LGF attributes to patches, if they are present. This information is used later during a copy and mirror operation, if the hull is symmetrical.

You can also export geometry data in ACIS or IGES format. The export operation operates against selected sheetbody and wirebody objects.

If you are exporting in IGES format, you can set the output data units using the **Tools > Options** command.

### ★ **IMPORTANT**

- You must have a license for IGES in order to use the **Import > IGES** or **Export > IGES** command.
- The data in the Geometry Analysis and Repair task is not saved in a session file or in the database. If you delete geometry, or define or refresh the workspace, the imported geometry is lost. You must export the data to an external file to save it. The imported geometry cannot be used to create objects in the database.

The Import and Export ACIS/IGES commands are available in the Molded Forms and Geometry Analysis and Repair tasks. The Structural Detailing task allows you to export ACIS and IGES data.

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## PDS Import

Imports PDS data from an .xml file, using mapping defined in a Microsoft Excel workbook (.xls file). The software validates the input .xml file against the defined PDS schema. Smart 3D validates the .xml file based on the PDS .xml data and the discipline PDS schema (Equipment, Piping, HVAC, or Electrical for example) to verify that the file is valid for import.

- Define your workspace before importing.
- Import PDS data using **File > Import > PDS Import**.
- Use the PDS Model Data Exporter to create the input .xml file for importing. For more information, see PDS Model Data Exporter.

### See Also

*PDS Import Dialog box* (on page 55)  
*Import Equipment* (on page 56)  
*Import Piping* (on page 58)  
*Import HVAC* (on page 59)  
*Import Electrical* (on page 60)

## **PDS Import Dialog Box**

### **Input Folder/XML File**

Specifies the PDS .xml file to import. Click ... next to the field to browse to the file. If you select the parent folder, Smart 3D imports all of the .xml files in that folder.

You select any PDS .xml file. The software selects the corresponding mapping file based on the discipline and imports in the following order:

1. Import Equipment
2. Import Piping
3. Import HVAC
4. Import Electrical

### **Mapping File**

Specifies the .xls mapping workbook. Click ... next to the field to browse to the file.

### **Log File**

Specifies the name and location of the log file. Click ... next to the field to browse to the file.

### **Customize Input XML File**

Click to import only the items that you specify. Clear to import all of the items. To specify a subset of items to import, click **Customize**.

### **Output XML File**

Specifies the .xml file to which the software writes the output. This file is also used for a selective import.

### **Import**

Imports the .xml file as specified without closing the dialog box.

### Customize

Displays a dialog box that shows the available items to import from the .xml file. Select the items to import, and then click **OK**.

The following items might display, depending on the contents of the .xml file:

Discipline	Selectable Items
Piping	Pipelines and associated pipe runs. You can select only pipelines.
Equipment	Designed equipment and catalog equipment.
HVAC	Duct runs.
Electrical	Cableways and conduit runs.

Only items that have a name in the .xml file are available for selection. Smart 3D does not import items without names through customization. If none of the items the .xml file have names, then you cannot import them selectively. In this situation, the software displays a message telling you that there are no items to customize. You could import all of these items using the **Import** option.

### Cancel

Cancels the operation.

### View Log

Displays the log file as defined in the **Log File** box.

## **Import Equipment**

Imports Equipment data from an .xml file using mapping defined in an .xls (Microsoft Excel workbook) file. The software validates the input .xml file against the defined equipment import schema to verify that the file is valid for import.

### **Importing PDS Parametrics as Catalog Equipment into Smart 3D:**

Use the **Type** column in the **PDS-EQP-Parametrics** sheet to map PDS parametric equipment to Smart 3D catalog equipment. If you specify the **Type** as **CatalogEquipment**, then the software imports the corresponding parametric into Smart 3D as catalog equipment.

Case 1: Multiple parametrics might exist under a Design Equipment tag in a PDS .xml file for which the **Type** is specified as **CatalogEquipment**. In this case, the software creates a new equipment system, and parametrics are imported as catalog equipment into this new equipment system. If any primitives follow the parametric equipment under the Design Import tag, then the software creates an additional Design Equipment tag under the first equipment system. The primitives are then imported as corresponding shapes under this Design Equipment tag. The software names both the equipment system and the design system with the name of the design equipment originating in the input .xml.

Case 2: One or more parametrics can exist in a PDS .xml file under a Design Equipment tag. However, if the **Type** for exactly one parametric is specified as **Catalog Equipment**, then that parametric is imported into Smart 3D as catalog equipment. The remaining parametrics are

imported as equipment components under this catalog equipment. Additionally, all the primitives that occur under the same parent Design Equipment tag are imported as shapes under this Catalog Equipment tag. Thus, in this case, the newly created catalog equipment receives the name of the design equipment from the input XML.

## Sample Mapping Files

In the delivered sample mapping workbook, *EQPTranslationMap.xls*, click the **Index** tab to view the worksheet name of the sheets. Click the name to jump to that sheet. For example, click **AspectMap** and view or specify the lookup reference between Aspect attribute in XML to the S3D Equivalent Aspect.

Example mapping configuration files for importing Intergraph Schema files are delivered in *[Product Folder]\Translators\ConfigurationFiles\Equipment*.

## Actions Taken

When you import equipment data, the command does the following:

- Creates the design equipment
- Adds shapes, nozzles, and parametrics to the design equipment
- Imports equipment attributes, nozzles, shapes, parametric dimensional attribute, and orientation
- Imports user attributes for equipment and nozzles

**NOTE** If there is an item in the .xml file that has the model system set to blank or **Undefined**, the **Import** command creates a generic system under the root with the naming convention *xxxxxxImport-Date-Time*. For example, the name might be *EquipmentImport-6-27-2005 09:09:57AM*. All objects with the blank or **Undefined** parent system import to this new system. After import, you can move the objects to your own System hierarchies.

## See Also

*PDS Import Dialog box* (on page 55)

*Import Equipment Data Using PDS Model Data Exporter* (on page 57)

## Import Equipment Data Using PDS Model Data Exporter

1. Use the **PDS Model Data Exporter** to create an import XML file. For more information, see **PDS Model Data Exporter**.
2. Select **File > Import > PDS Import**.  
The **PDS Import** dialog box displays.
3. Click ... next to the **Import Folder/XML File** box to select the equipment .xml file to use for import.
4. Click ... next to the **Mapping File** box to select the .xls map workbook to use for import.
5. Optionally, select the **Customize Input XML File** box.
  - a. Click ... next to the **Output XML File** box to select the output .xml file path.
  - b. Click **Customize** to select the items for selective import.
6. Click **Import** to import the equipment data as specified. If problems occur, check the import log file created in the same location as the input .xml file.

---

7. Check the **To Do List** for items that require attention after importing.

## Import Piping

Imports Piping data from an .xml file using mapping defined in an .xls (Microsoft Excel workbook) file. The software validates the input .xml file against the defined Piping import schema to verify that the file is valid for import.

### Sample Mapping Files

In the delivered sample mapping workbook, *PipingTranslationMap.xls*, click the **Index** tab to view the worksheet name of the sheets. Click the name to jump to that sheet. For example, click **InstrumentMap** and view or specify details about Instrument Item Mapping.

Example mapping configuration files for importing Intergraph Schema files are delivered in *[Product Folder]\Translators\ConfigurationFiles\Piping*.

### Actions Taken

When you import piping data, the command:

- Creates pipeline systems if they do not already exist. If the parent piping system is identified in the input XML file, the pipelines are created under the Piping systems. Otherwise, the pipelines are created under the Model root.
- Creates pipe runs, route network, and branching.
- Imports piping components along the network. However, items not listed in the mapping .xls file are not imported. Some PDS instruments and specialties might not have equivalents in Smart 3D. Also, some Smart 3D implied parts are handled differently than in PDS. Therefore, some mapping entries might need to be hard-coded to take care of them. Examples include branching components such as flanges around valves.
- Creates Smart 3D supports using G-Type graphics for PDS Physical Pipe Supports. To import G-Type graphics using Pipe Import, load the HS\_System.xls file located in *[Product Folder]\CatalogData\Bulkload\DataFiles* to the existing catalog database.
- Imports tap information, specified as **GenericNotes** added on associated pipe run ends indicating tap details.
- Places supports (logical only).
- Joins pipeline ends to specified nozzles that have already been imported.
- Attempts to correct eccentric reducer offset mismatches between input data and Smart 3D.
- You must reestablish piping connectivity, because the software does not maintain this across .xml files.
- To maintain connectivity, export all models to a single .xml file.

**NOTE** If there is an item in the .xml file that has the model system set to blank or **Undefined**, the **Import** command creates a generic system under the root with the naming convention *xxxxxxImport-Date-Time*. For example, the name might be *PipingImport-6-27-2005 09:09:57AM*. All objects with the blank or **Undefined** parent system import to this new system. After import, you can move the objects to your own System hierarchies.

### See Also

*PDS Import Dialog box* (on page 55)

*Import Piping Data Using PDS Model Data Exporter* (on page 59)  
*Import Sloped Piping* (on page 59)

### **Import Piping Data Using PDS Model Data Exporter**

1. Use the **PDS Model Data Exporter** to create an import .xml file. For more information, see **PDS Model Data Exporter**.
2. Select **File > Import > PDS Import**.  
*The **PDS Import** dialog box displays.*
3. Click ... next to the **Import Folder/XML File** box to select the .xml file to use for import.
4. Click ... next to the **Mapping File** box to select the .xls map workbook to use for import.
5. Optionally, select the **Customize Input XML File** box.
  - a. Click ... next to the **Output XML File** box to select the output .xml file path.
  - b. Click **Customize** to select the items for selective import.
6. Click **Import** to import the piping data as specified.
7. Check the **To Do List** for items that require attention after importing.

### **Import Sloped Piping**

A pipe run that is non-orthogonal to the elevation plane is imported as a sloped run. During the import, the software calculates the minimum slope by considering all legs in the run. The resulting slope value is set on the imported slope run as the minimum value.

### **See Also**

*Import Piping* (on page 58)

## **Import HVAC**

Imports HVAC data from an .xml file using mapping defined in an .xls (Microsoft Excel workbook) file. The software validates the input .xml file against the defined HVAC import schema to verify that the file is valid for import.

### **Sample Mapping Files**

In the delivered sample mapping workbook, **HVACTranslationMap.xls**, click the **Index** tab to view the individual worksheet names. Click the name to jump to that sheet. For example, click **ComponentMap** and view or specify Maps XML Component PartNumber, S3D PartClass, and S3D Part Number.

Example mapping configuration files for importing Intergraph Schema files are delivered in **[Product Folder]\Translators\ConfigurationFiles\HVAC**.

### **Actions Taken**

When you import HVAC data, the command does the following:

- Creates duct runs
- Imports the route network
- Imports branching configurations

- Imports components
- Imports attributes and user attributes

**NOTE** If there is an item in the .xml file that has the model system set to blank or **Undefined**, the **Import HVAC** command creates a generic system under the root with the naming convention *xxxxxxImport-Date-Time*. For example, the name might be *HVACImport-6-27-2005 09:09:57AM*. All objects with the blank or **Undefined** parent system import to this new system. After import, you can move the objects to your own System hierarchies.

## See Also

*PDS Import Dialog box* (on page 55)

*Import HVAC Data Using PDS Model Data Exporter* (on page 60)

### **Import HVAC Data Using PDS Model Data Exporter**

1. Use the **PDS Model Data Exporter** to create an import .xml file. For more information, see **PDS Model Data Exporter**.
2. Select **File > Import > PDS Import**.  
*The PDS Import dialog box displays.*
3. Click ... next to the **Import Folder/XML File** box to select the .xml file to import.
4. Click ... next to the **Mapping File** box to select the .xls map workbook to use for import.
5. Optionally, select the **Customize Input XML File** box.
  - a. Click ... next to the **Output XML File** box to select the output .xml file path.
  - b. Click **Customize** to select the items for selective import.
6. Click **Import** to import the HVAC data as specified. If problems occur, check the import log file created in the same folder as the input .xml file.
7. Check the **To Do List** for items that require attention after importing.

### **Import Electrical**

Imports Electrical data from an .xml file using mapping defined in an .xls (Microsoft Excel workbook) file. The software validates the input .xml file against the defined electrical import schema to verify that the file is valid for import.

#### **Sample Mapping Files**

In the delivered sample mapping workbook, **ElectricalTranslationMap.xls**, click the **Index** tab to view the worksheet name of the sheets. Click the name to jump to that sheet. For example, click **Generic-ItemCode-Map** and view or specify details about Generic Conduit Component Mapping on that sheet.

Example mapping configuration files for importing Intergraph Schema files are delivered in *[Product Folder]\Translators\ConfigurationFiles\Electrical*.

#### **Actions Taken**

When you import electrical data, the command does the following:

- Creates cableways and conduit runs

- Imports the route network
- Imports branching configurations
- Imports components
- Imports attributes and user attributes

 **NOTE** If there is an item in the .xml file that has the model system set to blank or **Undefined**, the **Import Electrical** command creates a generic system under the root with the naming convention *xxxxxxImport-Date-Time*. For example, the name might be *ElectricalImport-6-27-2005 09:09:57AM*. All objects with the blank or **Undefined** parent system import to this new system. After import, you can move the objects to your own System hierarchies.

### See Also

*PDS Import Dialog box* (on page 55)

*Import Electrical Data Using PDS Model Data Exporter* (on page 61)

### **Import Electrical Data Using PDS Model Data Exporter**

1. Use the **PDS Model Data Exporter** to create an import .xml file. For more information, see **PDS Model Data Exporter**.
2. Select **File > Import > PDS Import**.  
*The PDS Import dialog box displays.*
3. Click ... next to the **Import Folder/XML File** box to select the .xml file to import.
4. Click ... next to the **Mapping File** box to select the .xls map workbook to use for import.
5. Click ... next to the **Log file** box to select the log file location.
6. Optionally, select the **Customize Input XML File** box.
  - a. Click ... next to the **Output XML File** box to select the output .xml file path.
  - b. Click **Customize** to select the items for selective import.
7. Click **Import** to import the electrical data as specified. If problems occur, check the import log file created in the same folder as the input .xml file.
8. Check the **To Do List** for items that require attention after importing.

## Import XMpLant Data

Import the .xml file data using the **File > Import > XMpLant Import** command in Smart 3D. The software updates the specified import log file. The **To Do List** includes any objects that require attention after importing. For more information on importing XMpLant data into Smart 3D, see *XMpLant Import Dialog Box* (on page 62).

 **NOTE** Define the workspace before importing.

### **XMpLant Import Dialog Box**

#### **Input Folder/XML File**

Specifies the XMpLant .xml mapping file to use for import. Click ... next to the field to browse for the mapping .xml file. If you select the parent folder, Smart 3D imports all of the .xml files in that folder.

#### **Mapping File**

Specifies the XMpLant XML mapping file to use for import. Click ... next to the field to browse to the mapping .xml file.

**Piping objects** - Example mapping configuration files for importing XMpLant Schema files are delivered to the *[Product Folder]\Translators\ConfigurationFiles\XMpLantSP3DMaps\Piping* folder.

**Equipment objects** - Example mapping configuration files for importing XMpLant Schema files are delivered to the *[Product Folder]\Translators\ConfigurationFiles\XMpLantSP3DMaps\Equipment* folder.

**HVAC objects** - Example mapping configuration files for importing XMpLant Schema files are delivered to the *[Product Folder]\Translators\ConfigurationFiles\XMpLantSP3DMaps\HVAC* folder.

**Electrical objects** - Example mapping configuration files for importing XMpLant Schema files are delivered to the *[Product Folder]\Translators\ConfigurationFiles\XMpLantSP3DMaps\Electrical* folder.

#### **Log File**

Specifies the location of the log file. Click ... next to the field to browse to the location.

#### **Cancel**

Cancels the operation.

#### **View Log**

Opens the log file.

#### **Import**

Imports the .xml file as specified without closing the dialog box.

## Import ACIS (File Menu)

The **File > Import > ACIS** imports wireframe and surface data from a file in the Acis .sat format. The imported geometry is not saved in the session file or in the database. After processing the data, you will need to export it to save your work. For more information, see *Export ACIS (File Menu)* (on page 92).

## Import Grids

The **File > Import > Grids** command imports a coordinate system into the model. This command recognizes XML and XLS files that have been exported from a different model.

### • TIPS

- You can modify the distance and angles in the exported XML or XLS in any accepted Units of Measure format and then import. It is easier to modify the inputs in XLS than in XML.
- You can use the **AvailableUnitFormats** sheet in the exported XLS file to understand the accepted Units of Measure format.
- Duplicate coordinate systems are not allowed in a model. If you try to import a coordinate system with a duplicate name, the software prompts you to change the name before importing.

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## Import coordinate system

1. Select **Tasks > Grids**.
2. Click **File > Import > Grids**.
3. In the **Import Grids** dialog box, browse to the import file location of the XLS or XML file that was exported from a different model.
4. Specify the **Import log file location**.
5. Select the coordinate systems to import from the list of all available systems.
6. Select a **Parent System** for the coordinate system.
7. Select a **Permission Group** for the coordinate system.
8. Click **View** to see the import file.
9. Click **Import**.

*A progress bar displays in the bottom of the dialog box.*

## ***General Tab (Import Grids Dialog Box)***

The **Import Grids** dialog box allows you to select which coordinate systems to import to the current model.

### **Import file location**

Specifies the XML or XLS file to import.

### **Import log file location**

Specifies the import process log file location.

### **Select coordinate systems to be imported**

Specifies the coordinate systems to import.

#### **Select All**

Selects all available coordinate systems in the list.

#### **Clear All**

Selects none of the coordinate systems in the list.

### **Parent System**

Assigns the coordinate system to a particular parent system.

### **Permission Group**

Specifies the permission group for the imported coordinate system.

### **View**

Displays the file selected for import.

### **Import**

Begins the import process.

### **Close**

Exits the **Import Grids** dialog box.

## ***Settings Tab (Import Grids Dialog Box)***

Specifies settings for the import process.

### **Include Custom Attributes**

Imports custom attribute settings.

## Import IGES (File Menu)

**File > Import > IGES** imports wireframe and surface geometry data from a file in IGES format into the software. The imported geometry is not saved in the session file or in the database. After processing the data, you will need to export it to save your work. For more information, see *Export IGES (File Menu)* (on page 94).

 **NOTE** You must have a license for IGES in order to use this command.

### Import ACIS or IGES data

1. Click **File > Import > ACIS** or **File > Import > IGES**, depending on what type of data to import.
2. Browse to locate the file.
3. Click **Open**.

#### **NOTES**

- A log file is saved in the folder where the input file resides.
- You can import data over other data. The effect is cumulative.

## Import Structure

The **File > Import > Structure > CIS/2** command imports a CIS/2 file into the model. This command recognizes Global User Identities (GUIDs) to uniquely identify objects and manages the electronic exchange with the other software package.

Members imported by this command are either standard or designed members depending on the cross-section specified in the import file. Assembly connections are created if that information is provided in the CIS/2 file and the appropriate import option is selected. Frame connections are always created and connect the members in the import file if the connection information is specified. Otherwise, the frame connections are set to "Unsupported".

If you have any questions about using this translator, please contact Intergraph Support. You can find support information on our web site: <http://support.intergraph.com>.

### Import of Attributes/Properties

User-defined attributes that were defined in the third-party software and exported from that application to the CIS/2 file can be mapped and imported to Smart 3D properties using the UserAttribute\_Map.xml file. A sample UserAttribute\_Map.xml file is delivered with Smart 3D in the *[Product Folder]\SmartPlantStructure\Symbols\StructureImportExportMaps* folder.

If the third-party attribute that you want to map does not have an equivalent property in Smart 3D, you need to add that property to Smart 3D (using bulkload) before you can map to it in the xml file.

If the third-party attribute does not have an entry in the mapping files but a property with the same name exists in the Smart 3D, then that third-party attribute will still import and populate the Smart 3D property even though it is not in the mapping file.

---

### What do you want to do?

- *Import Structure Model* (on page 66)

- Preview a CIS file (on page 66)

---

## Import structure model

1. Click **Tasks > Structure**.
2. Click **File > Import > Structure > CIS/2**.
3. Select the system in which to place the imported objects. You can create new systems in the Systems and Specifications task.
4. Select the coordinate system to which to associate the imported objects. You can create new coordinate systems in the Grids task.
5. Specify which objects to import by selecting the **New** box or which items to update by selecting the **Modified** box.
6. Click **Defaults** and define the default properties for imported objects that do not have recognized properties.
7. Specify the file name and folder for the CIS file.
8. Define a mapping file, if needed.
9. Define a log file name and folder.
10. In the **Action** box, select **Import**.
11. In the **Option** box, select whether the software should use default properties.
12. Click **Apply** to import the CIS file.
13. Click **View Log** to review the log file.

 **NOTE** You can use the **File > New Mapping File** command to create a section name mapping file to use when importing a structural model, or you can use one of the delivered mapping files in the *[Product Folder]\SmartPlantStructure\Symbols\StructureImportExportMaps* folder.

## Preview a CIS File

1. Click **Tasks > Structure**.
2. Click **File > Import > Structure > CIS/2**.
3. Select the system in which to place the previewed objects. You can create new systems in the Systems and Specifications task.
4. Select the coordinate system to which to associate the previewed objects. You can create new coordinate systems in the Grids task.
5. Specify which objects to preview by selecting corresponding **New** or **Modified** boxes.
6. Click **Defaults** and define the default properties for imported objects that do not have recognized properties.
7. Specify the file name and folder for the CIS file.
8. Define a mapping file, if needed.
9. Define a log file name and folder.

10. In the **Action** box, select **Preview**.
11. In the **Filter** box, select the preview option to use.
12. Click **Apply** to preview the CIS file.
13. Click **View Log** to review the log file.

 **NOTE** You must create a mapping file using the **File > New Mapping File Command** before you can use that mapping file when importing a structural model.

## Import Structure Dialog Box

Controls how objects are imported from the CIS/2 import file. Be sure to check the Compatibility Matrix before you import data. Open <https://smartsupport.intergraph.com> <https://smartsupport.intergraph.com>, select **View Downloads** at the top, and then select **Product Compatibility** under **Useful Links** on the right.

### System

Select the system to which to assign the objects being read. You can define new systems in the Systems and Specifications task. Select **More** to display all systems defined in the workspace or the model. For more information, see "Select System Dialog Box" in Place Linear Member Systems.

### Coordinate System

Select the coordinate system to which to assign the objects being read. If needed, you can create a new coordinate system in the Grids task.

### New

Loads any object in the CIS/2 file that is not in the model. Use the **All On** or **All Off** commands to select or clear all check boxes.

### Modified

Loads any object that exists in both the CIS/2 file and the model that has changed in the CIS/2 file. Use the **All On** or **All Off** commands to select or clear all check boxes.

### Members

Select to read into the model the members defined in the CIS/2 file. Openings on members are not imported. Members defined with a built-up cross-section are imported as designed members with these limitations:

- The member must be linear.
- The material and dimensions are defined by the build-up cross-section defined in the catalog. Any material or dimension values specified in the import file are ignored.
- The designed member parts must be imported along with the parent member system. Stand-alone designed member parts (such as connection parts and clip angles) are not imported.

### Slabs/Plates

Select to read into the model the slabs and plates defined in the CIS/2 file. Slabs are always read into the model using a sketch 3-D path. You can edit the slab path after the import, if needed. No grid lines associated with the slab are imported, and there are no constraints assigned to the slab.

**Walls**

Select to read into the model the walls defined in the CIS/2 file. All walls are imported as slabs.

**Openings**

Select to read into the model the openings (holes) defined in the CIS/2 file for slabs, walls, grating, and checker plates.

**Connections**

Select to read into the model the gusset plates, clip angles, and other plates and standard sections used to connect members. The detailing software marks these objects as connection parts in the CIS/2 schema during export.

**Assemblies**

Select to read into the model the assemblies defined in the CIS/2 file.

**All On**

Click to activate all **New** and **Modified** check boxes.

**All Off**

Click to clear all **New** and **Modified** check boxes.

**Defaults**

Activates a dialog box where you define properties to use when the object being imported does not have a recognized property.

**Default Properties Dialog Box**

The **Default Properties** dialog box defines properties to use when the object being imported does not have a recognized property. You activate this dialog box from the main **Import Structure** dialog box by clicking the **Defaults** button.

**Member Defaults****Type Category**

Select the type category to use when a member being imported does not have a recognized type category. You can define a custom member type category on the **Structural Member Type** sheet in the **AllCodeLists.xls** workbook.

**Type**

Select the type to use when a member being imported does not have a recognized type. The properties change depending on the member type that you select. You can define a custom member type on the **Structural Member Type** sheet in the **AllCodeLists.xls** workbook.

**Section Name**

Select the cross-section to use when a member being imported does not have a recognized section. Sections are defined in the reference data. See the Structure Reference Data Guide for more information about reference data.

**Material Name**

Select the material to use when a member being imported does not have a recognized

material.

#### **Material Grade**

Select the material grade to use when a member being imported does not have a recognized material grade.

### **Slab Defaults**

#### **Type**

Select the slab type to use when a slab being imported does not have a recognized slab type.

#### **Composition**

Select the slab composition to use when a slab being imported does not have a recognized slab composition.

#### **Material Name**

Select the material to use when a slab being imported does not have a recognized material.

#### **Material Grade**

Select the material grade to use when a slab being imported does not have a recognized material grade.

### **Plate Defaults**

#### **Type**

By default, all plates are imported as General plate systems. You cannot change this value.

#### **Naming Category**

Select a category for the plate system. Categories specify the role of the plate system in the model. The category is also used by the naming rule to name the plate part that is a child to the plate system.

#### **Tightness**

Select the level of tightness as it applies to the entire plate system.

#### **Continuity**

Select the continuity type for the plate system. Continuity defines how the plate system should react when it intersects another plate or profile system. Select Continuous to indicate that the plate system should penetrate the other system. Select Intercostal to indicate that the plate system should be penetrated by the other system.

#### **Priority**

Specify the continuity priority. This priority is used to specify which plate system is penetrated when two plate systems intersect, but have the same Continuity value. Plate systems with a lower continuity priority (1, 2, 3, for example) penetrate plate systems with a higher continuity priority (7, 8, 9, for example).

#### **Material**

Specifies the object material type, such as **Steel - Carbon** or **Steel - High Strength**.

#### **Grade**

Specifies the object material grade, such as **A36** or **A529**.

#### Thickness

Specifies the material thickness for the plate system.

#### Specification

Select the structural specification for the plate system.

#### Export file

Define the file name and folder path of the CIMsteel Integration Standard file to read. We recommend using a UNC path (`\server\share\filename.stp`) in this box if you are going to batch import the file so that the batch computer can locate the file.

#### Include mapping file

Select this option to use a mapping file when importing the members from the CIS file. You use a mapping file to:

- Swap the third-party software name for a section (for example, L3.5X2.5X1/4) with the Smart 3D name for a section (for example, L3-1/2X2-1/2X1/4). You must create the section mapping file using the **File > New Mapping File Command** before you can use the mapping file in this command. Sample mapping files for the FrameWorks Plus AISC table are delivered with the software in *[Product Folder]\SmartPlantStructure\Symbols\StructureImportExportMaps*. For more information, see *New Mapping File* (on page 75).
- Swap the third-party material and material grade name with the Smart 3D name. A sample material mapping file for AISC is delivered with the software in *[Product Folder]\SmartPlantStructure\Symbols\StructureImportExportMaps*.
- Swap the third-party user-attributes (properties) with the Smart 3D properties names. A sample user attribute mapping file is delivered with the software in *[Product Folder]\SmartPlantStructure\Symbols\StructureImportExportMaps*.

You must bulkload (create) properties in the Smart 3D catalog for those third-party attributes that you want to map. For example, the third-party application has an attribute called "Expected Service Life" for members. Because Smart 3D does not have a property called "Expected Service Life", you need to add that property to members using reference data bulkload. See the *Reference Data Guide* and the *Catalog User's Guide* for more information on bulkloading.

#### Mapping file

Specify the mapping file to use if **Include mapping file** option is selected.

#### Log file

Specify a log file name. You can view the log file after processing by clicking **View Log**.

#### Action

Select whether to import or preview the contents of the CIS/2 file.

- Select **Import** to import objects from the CIS/2 into the model. This option checks the unique identification numbers in the CIS/2 file with the identification numbers of the model objects finding matching objects. This option allows you to update model objects that had been imported previously. Plate objects in the CIS/2 file are imported as slabs.

- Select **Import Ignore IDs** to import objects from the CIS/2 into the model. This option does not compare identification numbers in the CIS/2 file with the identification numbers of model objects. This option allows you to import the CIS/2 objects as new, unique objects to the model. In marine or material handling modes, plate objects in the CIS/2 file are imported as plates. In plant mode, plates in the CIS/2 file are imported as slabs.
- Select **Preview** to identify problems with the CIS/2 file before the actual import is attempted. Objects in the CIS/2 file that have not been imported cannot be previewed.

#### Filter

Specifies how you want to preview the CIS/2 file. This option is only available when **Action** is set to **Preview**.

- **Objects in CIS file with unknown sections, material, or type** - Select this option to help identify potential problems with the CIS/2 file before you attempt the import. After using this option, you can add unknown sections, materials, and types to the mapping file.
- **Objects in DB that exist in CIS File** - Select this option to identify objects that are in both the model workspace and the CIS/2 file.
- **Objects in DB that are modified in CIS File** - Select this option to identify objects that are in both the model workspace and in the CIS/2 file but have different attributes (such as section size) in the CIS/2 file. This option is useful when "round tripping" between Smart 3D and another software package when you want to see which objects were modified in the other software package.
- **Objects in DB that do not exist in CIS File** - Select this option to highlight objects in the model workspace that do not have a corresponding object in the CIS/2 file. This option is useful when the CIS/2 file was originally exported from Smart 3D and you are "round tripping" between Smart 3D and another software package. Using this option, you can locate members in the model that may have been deleted in the other software package (and therefore, were not exported to the CIS/2 file.) This option is also useful for verifying that all members in the other software package were exported to the CIS/2 file.
- **Objects in DB that are not modified in CIS File** - Select this option to identify objects that are in both the model workspace and in the CIS/2 file that have the same attributes (such as section size). This option is useful when "round tripping" between Smart 3D and another software package when you want to see what objects in the Smart 3D model were *not* modified by the other software package.

#### Option

Specifies how you want to import objects from the CIS/2 file. This option is only available when **Action** is set to **Import**.

- **Use no defaults** - Select this option to import only those objects known to Smart 3D (known either in the software or in the specified mapping file) sections. Objects with unknown sections are not imported into the model but are noted in the log file.
- **Use defaults if needed** - Select this option to import all objects in the CIS/2 to the model. Objects with sections not found in the software or in the mapping file will be given the sections defined in the **Defaults** dialog box. Objects imported with default sections are noted in the log file.

#### Submit Job

---

Activates the **Schedule [Task]** dialog box, which is used to define the batch import of CIS/2 files using SmartPlant Batch Services. For more information on the batch settings, see *Schedule [Task] Dialog Box* (on page 74).

#### **View Log**

Displays the import log file. You must click **Apply** when importing in order to view the log at the end of processing or to use the **Preview** option. If you click **OK**, the dialog box is closed at the end of processing and you cannot click **View Log**.

#### **Understanding the Log File**

File name : C:\CIMSteel\cis2\_out.stp ---- *SHOWS HEADER INFORMATION FROM CIS/2 FILE*

Mapping file used : C:\CIMSteel\AISC\_Master\_Physical\_Map.XML

Intergraph Smart 3D Structure Version : 09.00.10.0003

CIS/2 Version : Tekla Structures Version : Next Build: 4232 Revision : 26.1.2009

File imported on : Tue Jan 19 16:26:34 2010

Parent System : Import

Coordinate System : Global

Importing with : Use no default sections

Processing Options : ---- *SHOWS HOW THE OPTIONS WERE SET ON THE DIALOG BOX*

New : On or Off

Members : ON

Slabs and Plates : ON

Walls : ON

Openings : ON

Connections : ON

Assemblies : ON

Modified : On or Off

Members : ON

Slabs and Plates : ON

Walls : ON

Openings : ON

Connections : ON

Assemblies : ON

\*\*\*\*\*Summary\*\*\*\*\*

Linear Members..... 333 ---- *LISTS SUCCESSFULLY IMPORTED OBJECTS TOTAL*

Curved Members..... 0

Slabs..... 0

Walls (imported as Slabs)..... 0

Plates..... 6

Openings..... 48

Stair Assemblies..... 8

    Stair Parts..... 18

Ladder Assemblies..... 3

    Ladder Parts..... 0

Handrail Assemblies..... 76

    Handrail Parts..... 249

Assy Connections..... 0

    Connection Parts..... 0

Embedment Assemblies..... 0  
Embedment Parts..... 0

Total Number of Objects Imported: 741  
Total Number of CIS Entities in the import file... 1133  
Total Number of Items not found in the catalog..... 360

\*\*\*\*\*

**CROSS SECTIONS --- LISTS ANY MISSING AND MAPPED CROSS-SECTIONS**

Cross Sections	Encountered	Mapped To
PL9.525*127	65	Not Found
W8x13	109	W8*13
W13*56	9	W8x13 (Default)

**MATERIALS --- LISTS ANY MISSING AND MAPPED MATERIALS**

Materials	Encountered	Mapped To
ANTIMATERIAL	30	A36

Import structure completed successfully on: Tue Jan 19 16:29:40 2010.

\*\*\*\*\*DETAILED SUMMARY\*\*\*\*\*

Plates Using Default material  
2331884  
2331863  
2331842  
1873861  
1873822  
Linear Members with Missing Cross Sections  
2354361  
2354229  
2013930  
2013876  
Handrail Parts with Missing Cross Sections  
2154615  
1995739  
1995257  
1994775  
1994293  
Stair Parts with Missing Cross Sections  
1908086  
1908063  
1908040  
Zero Length Ladder Parts  
2265509  
2264060  
1880386

Ladder parts with Missing Cross Sections:

1880370

1880231

1880223

1880213

\*\*\*\*\*

## **Schedule [Task] Dialog Box**

### **Queue**

Displays the name of the queues configured by an administrator for the job. For more information on configuring the queues, see *Configure Queues for Jobs* in the *Project Management User's Guide*.

### **Run job**

Sets the frequency with which the job runs. Jobs can be scheduled to run once or on a regular interval (daily, weekly, or monthly). Depending on the job frequency selected, additional controls display. These controls allow you to define more specific scheduling information. The scheduling controls can be changed only at job submission.

### **Run on**

Sets the time to start running the job.

### **Options**

Opens the *Optional Schedule Properties Dialog Box* (on page 75) that you can use to define a start and end date.

### **Run on box**

Contains a calendar from which you can select the run date. This option is available when you select **Once** from **Run job**.

### **Every X days**

Specifies how many days pass between job runs. This option is available when you select **Daily** from **Run job**.

### **Every X weeks**

Specifies how many weeks pass between job runs. In addition, you can select on which days the job runs. This option is available when you select **Weekly** from **Run job**.

### **Day X of the month**

Specifies on which day of the month the job runs. This option is available when you select **Monthly** from **Run job**.

### **The X Y of the month**

Specifies on which day of the month the job runs. For example, you can select the last Monday of the month. This option is available when you select **Monthly** from **Run job**.

### **Job Start**

Notifies you when the job starts, if Outlook is set up.

### **Job Completion**

Notifies when the job completes, if Outlook is set up.

**Job Abort**

Notifies you if the job aborts, if Outlook is set up.

**Address Book**

Selects the name of the person to be notified by e-mail of the job status, if Outlook is set up. If Outlook is not available, this option does not work. You can also type the address manually. The person you define here receives an email with the job log files after the job finishes.

**NOTES**

- The Batch Services SMTP option must be configured on the batch server for this to work. For more information, see the Intergraph Smart Batch Services documentation.
- The WinZip application is no longer required on the batch server to compress any emailed attachments. Compression is now done with functionality included in Smart 3D.

***Optional Schedule Properties Dialog Box***

Provides more options on the **Schedule Backup** dialog box. This dialog box opens when you click **Options**.

**Start date**

Sets an optional start date.

**End date**

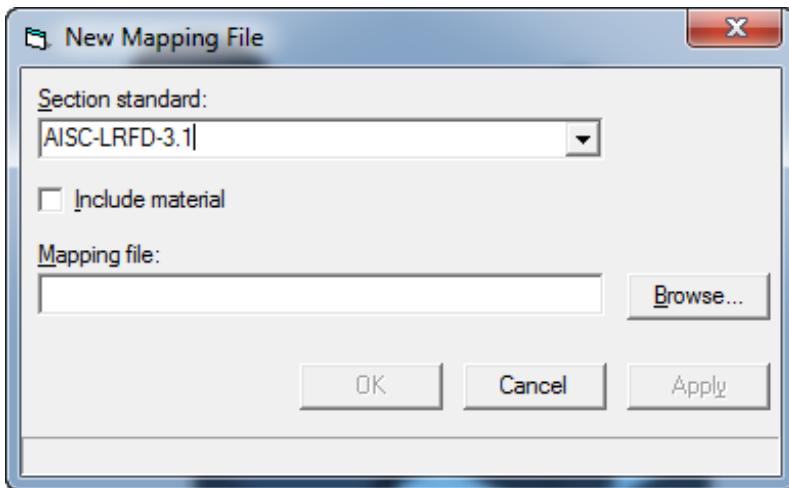
Sets an optional end date, if checked.

***New Mapping File***

The **File > New Mapping File** command creates an XML mapping file for the section names, and optionally material names, used in the software and third-party application. Many times, the software and the third-party application use different names for the same section or material. The mapping file solves the naming conflicts by mapping section names in the software to section names in the other applications. The mapping file must contain each section standard table that you have used in the model.

**CAUTION** The mapping file created by this command is a template. The software does not write known-to-be-different section names to the mapping file. You are responsible for verifying, editing, updating, and maintaining the third-party application section names in the file.

## New Mapping File Dialog Box



### Section standard

Select the section standard table for which to create a mapping file.

### Include material

Select to include material name mappings in addition to the section name mappings.

### Mapping file

Specify a name and folder path for the XML mapping file.

### Mapping File Format

The mapping file is an XML-formatted file with which you can define mappings for section names, material names, member types, slab types, and user-defined attribute/properties between Smart 3D and the third-party software. The format for each mapping is given below. You can include all five mappings in a single XML file, or you can define the mappings in separate XML files and reference the five files in a single master XML file using include statements. Using separate files that are pulled together using include statements might be a better workflow as it allows you to quickly mix and match files for different requirements.

You cannot nest include files. Only the master XML mapping file can call an include file. You cannot call another include file inside an include file. An example of a master XML mapping file is shown below:

```
<xml>
<!-- Comment Line -->
<IncludeXML href="SectionStandard.xml" />
<IncludeXML href="Material.xml" />
<IncludeXML href="MemberTypes.xml" />
<IncludeXML href="SlabTypes.xml" />
<IncludeXML href="UserAttribute_Map.xml" />
</xml>
```

### Section Mapping

The <SectionStandard> area maps the software section names to the third-party section names. The software section names are labeled **section name**. The third-party section names are

labeled **externalname**. When the XML file is created, the software section name is duplicated for the third-party section name. You must verify that the correct third-party section name is defined for **externalname** by manually editing the XML file.

```
<xml>
<!-- Comment Line -->
<SectionStandard>
    <Standard name="AISC-LRFD-3.0" externalname="AISC" externalorganization="user"
        externaldate="2002" externalversion="1.0" />
    <Sections>
        <Section name="W10x39" externalname="W10x39" />
        <Section name="W10x33" externalname="W10x33" />
        <Section name="W10x30" externalname="W10x30" />
        ...
    </Sections>
</SectionStandard>
</xml>
```

## Material Mapping

The <MaterialStandard> area maps the software material grade names to the third-party material grade names. You must have selected the **Include material** option when you created the XML file to see the material grade name mappings. The software materials are labeled **Material type** and **grade**. The third-party material names are labeled **externalname**. You must verify that the correct third-party material grade name is defined for **externalname** by manually editing the XML file. You must provide the external material standard name information by manually editing the XML file.

```
<xml>
<!-- Comment Line -->
<MaterialStandard>
    <Standard name="" externalname="" externalorganization="" externaldate="" externalversion="" />
    <Materials>
        <Material type="Steel - Carbon" grade="A36" externalname="A36" />
        <Material type="Steel - Carbon" grade="A529" externalname="A529" />
        <Material type="Steel - Carbon" grade="A588" externalname="A588" />
        ...
    </Materials>
</MaterialStandard>
</xml>
```

## Member Type Mapping

The <MemberTypes> area maps the software member types to the third-party member types. You must create this section in a text editor. The software member types are labeled **Member type**. The third-party member types are labeled **externaltye** and **externalrole**.

```
<xml>
<!-- Comment Line -->
<MemberTypes>
    <Member type="Beam" externaltye="Beam" externalrole="" />
    <Member type="Girder" externaltye="Beam" externalrole="gantry_girder" />
    <Member type="Joist" externaltye="Beam" externalrole="joist" />
    ...
</MemberTypes>
</xml>
```

## Slab Type Mapping

The <SlabTypes> area maps the software slab types to the third-party slab types. You must create this section in a text editor. The software slab types are labeled **Slab type** and **composition**. The third-party slab types are labeled **externaltye**.

```
<xml>
<!-- Comment Line -->
<SlabTypes>
    <Slab type="4&quot; Cast in Place" composition="CIP_4&quot;_Fc3" externaltye="slab" />
    <Slab type="4&quot; Cast in Place" composition="CIP_4&quot;_Fc4" externaltye="flat_slab" />
    <Slab type="5&quot; Cast in Place" composition="CIP_5&quot;_Fc3" externaltye="wall" />
    ...
</SlabTypes>
</xml>
```

## User Attribute Mapping

The <UserAttributes> area maps third-party software attributes to Smart 3D properties. You must create this section in a text editor.

```
<xml>
<!-- Comment Line -->
<UserAttributes>
    <Object type="CSPSMemberSystemLinear" externaltype="assembly_design_structural_member_linear" role="" >
        <Interface name="IJUASTructuralFrameItemAttributes" externalname="IJUASTructuralFrameItemAttributes" >
            <Attribute name="item_number" externalname="item_number" />
            <Attribute name="item_name" externalname="item_name" />
            <Attribute name="item_description" externalname="item_description" />
            <Attribute name="life_cycle_stage" externalname="life_cycle_stage" />
        </Interface>
        <Interface name="IJUASTructuralFrameProductAttributes" externalname="IJUASTructuralFrameProductAttributes" >
            <Attribute name="life_cycle_stage" externalname="life_cycle_stage" />
        </Interface>
        <Interface name="IJUAAAssemblyAttributes" externalname="IJUAAAssemblyAttributes" >
            <Attribute name="assembly_sequence_number" externalname="assembly_sequence_number" />
            <Attribute name="complexity_level" externalname="complexity_level" />
        </Interface>
        <Interface name="IJUADSMAttributes" externalname="IJUADSMAttributes" >
            <Attribute name="key_member" externalname="key_member" />
            <Attribute name="structural_member_use" externalname="structural_member_use" />
            <Attribute name="Floor Thickness" externalname="Floor Thickness" />
            <Attribute name="structural_member_class" externalname="structural_member_class" />
        </Interface>
    </Object>
...
</UserAttributes>
</xml>
```

### Create a Mapping File

1. Click **File > New Mapping File**.
2. In the **Section standard** box, select the section standard for the mapping file.
3. Optionally, select **Include material** to write material names to the mapping file.
4. Click **Browse**, and then specify a name and folder location for the mapping file.
5. Click **OK**.
6. Edit the mapping file using a text editor such as **Notepad**, and define the third-party standard section, material names, member types, and slab types.

## Import Bocad

The **File > Import > Structure > Bocad** command imports a Bocad® .bti file into Smart 3D.

### Import of Attributes/Properties

Attributes that were defined in bocad and exported can be mapped and imported to Smart 3D properties using the sample UserAttribute\_Map.xml file. These attributes are included in the BOCAD\_Master\_Physical\_Map.xml file. This file is delivered with Smart 3D in the *[Product Folder]\SmartPlantStructure\Symbols\StructureImportExportMaps* folder.

If the bocad attribute that you want to map does not have an equivalent property in Smart 3D, you need to add that property to Smart 3D (using bulkload) before you can map to it in the xml file.

If the bocad attribute does not have an entry in the mapping files but a property with the same name exists in the Smart 3D, then that third-party attribute imports and populates the Smart 3D property even though it is not in the mapping file.

## Member Orientation and Member Type

The physical orientation of the member determines the member type during import.

- If the bocad member name exactly matches an existing member type defined in Smart 3D, then the software sets the member to that member type regardless of orientation. For example, if a member has an orientation greater than 10° from vertical but is named "Column", the software imports that member as a column despite the member having an orientation of a vertical brace.
- Members that are vertical or within 10° (1/10 slope) of vertical import as columns.
- Members that are horizontal or within 10° of horizontal import as beams.
- Members that are between 10° of horizontal and 10° of vertical import as vertical braces.
- Members are never imported as horizontal braces as there is no way to distinguish horizontal braces from beams. You must manually edit the members that are horizontal braces after import and set the correct member type.
- All curved members import as beams.

## Limitations

- Curved members are imported using the resolution defined in the import file.
- Built-up members are imported if the mapping file is defined to do that.
- Previously imported structure is not updated on subsequent imports. In this situation, either that structure is skipped, replaced, or imported as a copy depending on the import option chosen.

## How to Import a bocad File

1. Select **File > Import > Structure > Bocad**.
2. Select the system and coordinate system to use for the imported objects.
3. Select whether to import members (with or without openings) and plates (with or without openings).
4. Define the .bti file to import.
5. Select the mapping file.
6. Define the location and name for the log file.
7. Select the action to perform when you click **Import**.
8. Click **Import**.

## bocad Import Dialog Box

Controls how objects are imported from the bocad .bti file. Be sure to check the Compatibility Matrix before you import data. Open <https://smartsupport.intergraph.com> <https://smartsupport.intergraph.com>, select **View Downloads** at the top, and then select **Product Compatibility** under **Useful Links** on the right.

### System

Select the system to which to assign the objects being imported. You can define new systems in the Systems and Specifications task. Select **More** to display all systems defined in the workspace or the model.

### Coordinate System

Select the coordinate system to use for the imported objects. All objects are placed relative to this coordinate system.

### Members

Select to import members in the import file. Clear this option to not import members in the import file.

### Plates

Select to import plates in the import file. Clear this option to not import plates in the import file.

### Openings

Select to import opening in members and plates. Clear this option to not import openings.

### Import File

Define the file name and folder path of the bocad .bti file to read and import.

### Mapping file

Specify the mapping file to use. A sample mapping BOCAD\_Master\_Physical\_Map.xml file is delivered with Smart 3D in the *[Product Folder]\SmartPlantStructure\Symbols\StructureImportExportMaps* folder.

### Log file

Specify a log file name.

### Action

Select whether to import or preview the contents of the bocad file.

- Select **Import** to import objects from the bocad into the model. This option checks the unique identification numbers in the bocad file with the identification numbers of the model objects finding matching objects. Matching objects from the bocad file are skipped during import because they already exist in the model. Only new members in the bocad file are imported into the model.
- Select **Import as copy** to import objects from the bocad into the model. This option does not compare identification numbers in the bocad file with the identification numbers of model objects. This option allows you to import the bocad objects as new, unique objects to the model.
- Select **Import and replace** to import objects from the bocad into the model. This option checks the unique identification numbers in the bocad file with the identification

numbers of the model objects finding matching objects. This option deletes the existing, matching model object and places a new model object from the bocad file. Because of this delete and replace, other objects connected to the deleted and replaced object must be reconnected using Member Autoconnect.

- Select **Preview** to identify problems with the bocad file before the actual import is attempted. Objects in the bocad file that have not been imported cannot be previewed. All cross-sections, materials, and plate stocks found in the import file are written to the log file.

#### **View Log**

Opens the log file.

## **Import Ship Structure (File Menu)**

**File > Import > Ship Structure**, available in the Molded Forms and Structural Detailing tasks, imports Tribon marine structure XML data into Smart 3D for planning and outfitting work.

To use this command, you must purchase and install the **Intergraph Smart™ 3D Tribon Interface** (SEBY812AG) from Smart 3D. Please contact Intergraph Support for licensing information.

Before you can import the data into Smart 3D, you must export the data from Tribon Initial Design Version M3 (Version 1.3). Smart 3D only supports XML in Schema V3 format.

*Import Ship Structure Dialog Box (on page 81)*

### **Import ship structure data**

1. Export data from Tribon Initial Design to create an M3 XML file.
2. In Smart 3D, select **File > Import > Ship Structure**.

*The **Import Ship Structure** dialog box appears.*

3. Click the button next to the **XML file or path** box to navigate to the appropriate folder location, and do one of the following:

Click **Open** to process all of the valid XML files in the folder.

OR

Select the individual XML file to use for import, and then click **Open**.

4. Click the button next to the **Map file** box to select the XLS map workbook to use for import, and then click **Open**.
5. Select a system to use as the parent for the imported data.
6. Click **OK** to import the Tribon data as specified, or click **Submit Job** to run the import as a batch job.

 **NOTE** For more information about setting up the batch service, see *Installing Batch Services* in the *Intergraph Smart™ 3D Installation Guide*.

### **Import Ship Structure Dialog Box**

Sets options for importing Tribon XML data.

**XML file or path**

Specify the name of and path to the XML file exported from Tribon. To process multiple files simultaneously, specify the name of and path to the folder that contains the XML files to import. Alternatively, you can use the browse feature and navigate to the file or folder of files to be used for import.

**Map file**

Specify the name of and path to the mapping file between the Tribon XML data and the Smart 3D data in the catalog. For more information, see *Import Translation Map Workbook* (on page 82).

**System**

Select a system in the Smart 3D model under which to place the imported data.

## ***Import Translation Map Workbook***

The Microsoft Excel workbook named **SM\_Mapping.xls** is delivered in the *[Reference Data Folder]\SharedContent\Data\TribonTranslator\MappingFiles* folder. This workbook maps Tribon material and cross-section names to Smart 3D material and cross-section names.

The Cross Section worksheet maps profile cross-section names between the Tribon XML file and Smart 3D.

*Cross Section Worksheet* (on page 82)

The Material worksheet maps Tribon material names to Smart 3D material names.

*Material Worksheet* (on page 83)

### ***Cross Section Worksheet***

The **Cross Section** sheet of the **SM\_Mapping.xls** workbook maps Tribon profile cross-section names in the XML file to Smart 3D profile cross-section names.

**Section Name**

Type the Smart 3D profile cross-section name.

**Imported Family Name**

Type the Tribon profile cross-section name as it appears in the XML file.

 **NOTE** The last item listed for each section type is the default value for that section type.

## Material Worksheet

The **Material** sheet of the **SM\_Mapping.xls** workbook maps Tribon materials in the XML file to Smart 3D materials.

### Material Type

Type the Smart 3D material type.

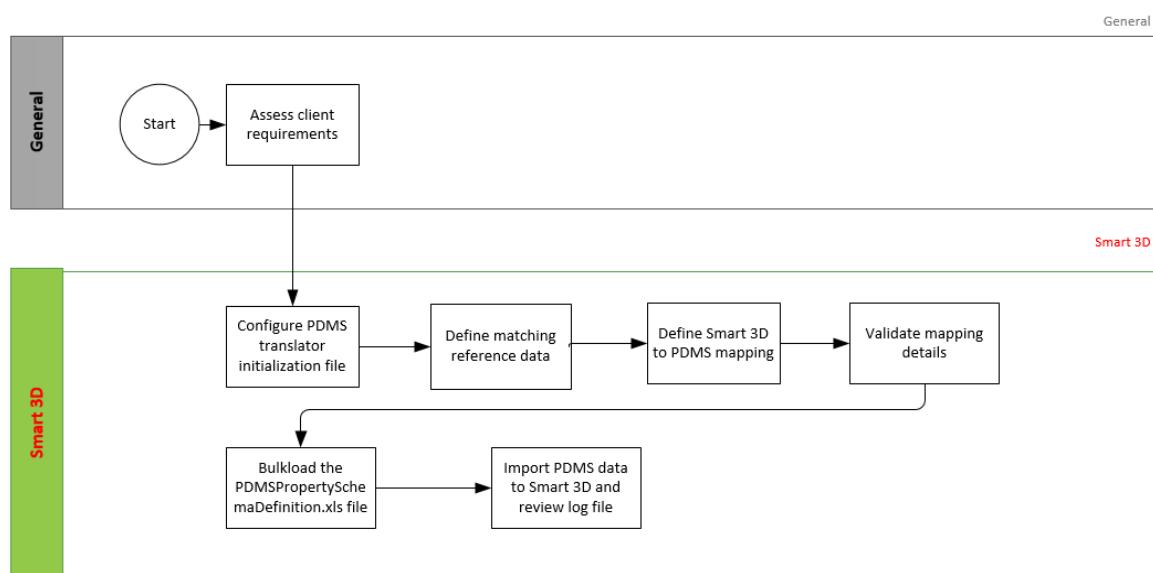
### Material Grade

Type the Smart 3D material grade.

### Imported Material Grade

Type the Tribon material name as it appears in the XML file.

## Import PDMS data to Smart 3D



**★IMPORTANT** Prior to importing a PDMS DATAL file to Smart 3D, verify that the appropriate mapping has been completed and that both catalogs have been set up appropriately. For more information about mapping and setting up the catalog, see Appendix: PDMS Import to Smart 3D Workbook and Define matching reference data, respectively.

1. In the Smart 3D Common task, click **File > Import > PDMS Data Import > Import Model**.  
The **S3D PDMS Data Import** dialog box appears.
2. Select the parent system.  
**† TIP** The parent system determines where the imported PDMS objects are placed.
3. Specify the name and full path location of the PDMS input DATAL file in the **Datal File** box.
4. Navigate to the mapping file.
5. Specify the name and full path location for the log file.

6. Select the disciplines to import.
7. Click **OK** to start the import process.

*When processing completes, the dialog box closes.*

**💡 TIP** If you click **Apply** instead of **OK**, the dialog box remains open when processing completes so you can click **View Log** to open the log file. Otherwise, you must manually navigate to the log file.

8. Review the log file for errors and warnings.

#### ▣ NOTES

- All of the imported objects are placed under the selected parent system.
- The mapping file is an Excel workbook that is used to map all the objects and their properties in Smart 3D and PDMS. This workbook is delivered to the *[Reference Data Folder]\SharedContent\Translators\PDMSS3DImport* folder during setup.

## S3D PDMS Data Import Dialog Box

Provides options that control how the PDMS DATAL file is read by Smart 3D during import.

### Select Parent System

Specifies the parent system under which imported objects are placed when imported.

### Data File

Specifies the file name and folder path of the input DATAL file to read.

### Mapping File

Indicates the mapping file to use in the import process. The mapping file is an Excel workbook that is used to map all the objects and their properties in Smart 3D and PDMS. For more information, see Appendix: PDMS Import to Smart 3D Workbook.

### Log File

Specifies a name for the log file. You can view the log file at the end of processing by clicking **View Log**.

**▣ NOTE** **View Log** is available only if you click **Apply** to begin the import process.

### Disciplines to Import

Determines which object discipline sets are imported. When you select a discipline, the related objects from that discipline are imported into Smart 3D.

### OK

Imports the data as specified and closes the **S3D PDMS Data Import** dialog box after the import process is complete.

### Apply

Imports the data as specified without closing the **S3D PDMS Data Import** dialog box.

### Cancel

Cancels the operation and closes the **S3D PDMS Data Import** dialog box.

**View Data**

Opens the input DATAL file in the default text editor. This option is available only if you select an input DATAL file.

**View Log**

Displays the log file. To view the log file, you must click **Apply** to begin the import process. If you click **OK**, the dialog box closes at the end of processing and **View Log** is unavailable.

**See Also**

*Import PDMS data to Smart 3D (on page 83)*

## PDMS Import Validation

Use the **File > Import > PDMS Datal Import > PDMS Import Validation** command to validate the mapping data that you have defined in the PDMSS3DImportMapping.xls workbook. The command uses a specified set of user-defined criteria to locate missing mapping details, and then updates the mapping file.

Smart 3D updates individual worksheets with any missing mapping information. For identification, the software highlights the updated cells in red or yellow. A new sheet in the mapping file, **Smart 3D Objects - Missing Mapping**, lists all of the missing mapping information.

After running the validation tool, you must bulkload the **CustomInterfaces** sheet in the PDMSPropertySchemaDefinition.xls workbook into the Smart 3D catalog. This bulkload is required to add the PMDS interfaces to the Smart 3D catalog, and to update the Smart 3D property dialog boxes with the PDMS category.

The software writes the results of the validation process to a log file.

### Validation Criteria

#### Hierarchy

The import validation tool validates site, zone, and UDET data in the specified datal file.

The software updates the PDMSPropertySchemaDefinition.xls workbook with **InterfaceName** and **PDMS AttributeName** for attributes under **Site**, **Zone**, and **UDET**. The software also updates the HierarchyClassMap sheet in the PDMSS3DImportMapping.xls workbook with missing attributes of UDET data.

#### Equipment

The import validation tool validates equipment, sub-equipment, nozzle, and primitive data in the specified datal file.

The software updates the PDMSPropertySchemaDefinition.xls workbook with **InterfaceName** and **PDMS AttributeName** for attributes under **Equipment**, **Sub-Equipment**, **Nozzle**, and **Primitive**.

The software updates the following sheets in the mapping workbook:

- **CPSmartEquipmentMap** - Missing attributes of PDMS equipment.
- **CPEquipmentComptMap** - Missing attributes of PDMS sub-equipment.
- **CPShapMap** - Missing attributes pf PDMS primitives.
- **CPShapeValueMap** - Missing **Part types of PDMS Primitives**.

- **CPPipeNozzleMap** - Missing attributes of PDMS.
- **NozzleAdditionalAttrMap** - Missing PDMS **CATReference** for nozzles.
- **PartNumberValueMap** - Missing **PDMS SpecReference** of equipment and sub-equipment data.
- **AspectMap** - Missing **LEVEL** and **OBST** values of PDMS primitives.

## Piping

The import validation tool validates PDMS pipeline, pipe branch, pipe component, pipe instrument, and pipe support data in the specified .att file.

**NOTE** For the piping discipline, the software automatically selects the .att file from the specified .dtl file location. The name of the .dtl file and the .att file must be the same. Both files must be in the same folder.

The software updates the PDMSPropertySchemaDefinition.xls workbook with **InterfaceName** and **PDMS AttributeName** for attributes under **Pipeline**, **Pipe Branch**, **Pipe Component**, **Pipe Instrument**, and **Pipe Support**.

The software updates the following sheets in the mapping workbook:

- **CPPipelineSystemMap** - Missing attributes under **PDMS Pipeline system** in the .att file.
- **CPMPipeRunMap** - Missing attributes under the **PDMS** branch in the .att file.
- **PipeRunSpecMap** - Missing **Pipe Specification (PSPE)** of the **PDMS** branch in the .att file.
- **PipeComponentAttrsMap** - Missing attributes under **PDMS Pipe Components** in the .att file.
- **PipeInstrumentAttrsMap** - Missing attributes under **PDMS Pipe Instruments** in the .att file.
- **PipeSupportAttrsMap** - Missing attributes under **PDMS Pipe Supports** in the .att file.
- **S3DXMLPartTypeMap** - Missing **Components GType** for **Pipe Component**, **Pipe Instrument**, and **Pipe Support**.
- **SPREFS3DIdentifierPatternMap** - Missing **SPECReference (SPRE)** for **Pipe Component**, **Pipe Instrument**, and **Pipe Support**.

## HVAC

The import validation tool validates PDMS HVAC system, HVAC branch, HVAC component, and HVAC fitting data in the specified .att file.

**NOTE** For the HVAC discipline, the software automatically selects the .att file from the specified .dtl file location. The name of the .dtl file and the .att file must be the same. Both files must be in the same folder.

The software updates the PDMSPropertySchemaDefinition.xls workbook with **InterfaceName** and **PDMS AttributeName** for attributes under **HVAC System**, **HVAC Branch**, **HVAC Component**, and **HVAC Fitting** data.

The software updates the following sheets in the mapping workbook:

- **CPDuctingSystemMap** - Missing attributes under **PDMS HVAC System** in the .att file.

- **CPDuctRunMap** - Missing attributes under **PDMS HVAC Branch** in the .att file.
- **HVACRunSpecMap** - Missing **HVAC Branch specifications (PSPE)** in the .att file.
- **HVACRunMaterialMap** - Missing **HVAC Branch specifications (PSPE)** in the .att file.
- **DuctComponentAttrsMap** - Missing attributes under **PDMS HVAC Components** in the .att file.
- **DuctFittingAttrsMap** - Missing attributes under **PDMS HVAC Fitting** in the .att file.
- **S3DHVACXMLPartTypeMap** - Missing **Component GTypes of HVAC Components and HVAC Fittings** in the .att file.
- **SPREFS3DHVACIdentifierPtrnMap** - Missing **SPECReference (SPRE)** of **HVAC Component and HVAC Instrument** in the .att file.

## Electrical

The import validation tool validates PDMS cableway system, cableway branch, and cableway fitting data in the specified .att file.

 **NOTE** For the Electrical discipline, the software automatically selects the .att file from the specified .dtl file location. The name of the .dtl file and the .att file must be the same. Both files must be in the same folder.

**★IMPORTANT** PDMS does not currently have a keyword for electrical. Because electrical data is in the form of *new pipe*, the software validates cable way data in the pipe class mapping sheets.

## *PDMS Properties Extractor Dialog Box (on page 89)*

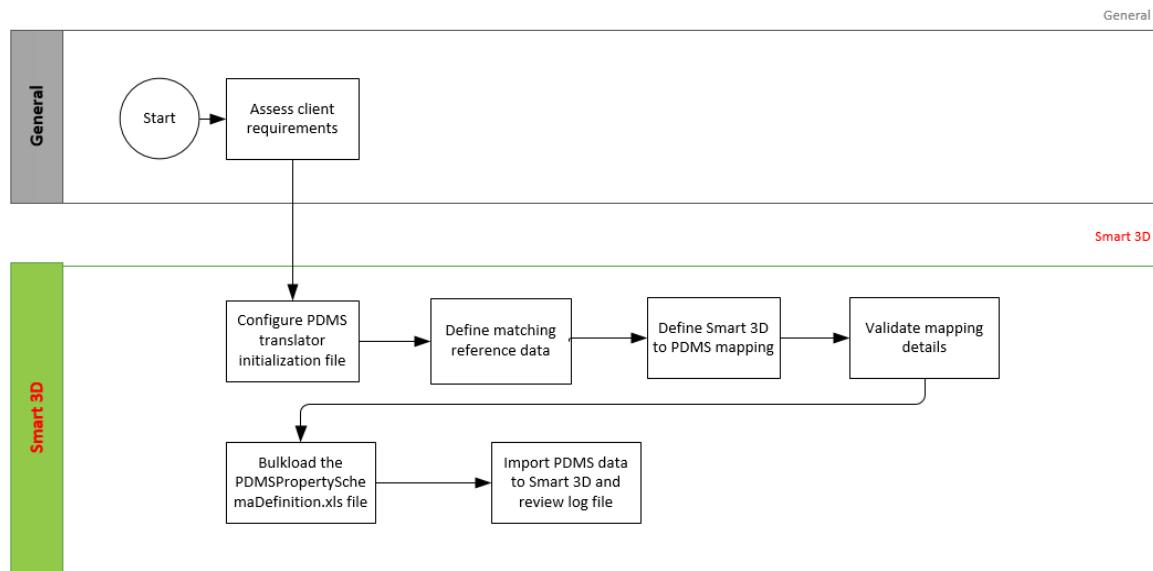
---

### What do you want to do?

- *Validate mapping details* (on page 88)
- *Bulk load the database* (on page 90)

---

## Validate mapping details



**★IMPORTANT** Close the mapping file before running the **PDMS Import Validation** command. To avoid errors, the mapping file must remain closed during the validation process.

1. Click **File > Import > PDMS Data Import > PDMS Import Validation**.  
The **PDMS Properties Extractor** dialog box appears.
2. Type the name and full path location of the DATAL file to validate. Alternatively, click **Browse**  and navigate to the appropriate file.
3. Specify the required mapping and schema definition files.
4. In **Validation Criteria**, select the discipline mapping to validate. You must select at least one criterion from the available options.
5. Click **Validate**.

*The software runs the validation tool and verifies the mapping details. During validation, the software updates the PDMSPropertySchemaDefinition.xls workbook with any missing objects. For identification, the software highlights the updated cells in red and yellow.*

6. Review the log file for any errors.

### NOTES

- By default, the following files are delivered during reference data installation:
  - The mapping file is delivered in the **[Reference Data Folder]\SharedContent\Data\Translators\PDMSS3DImport** folder.
  - The schema definition file is delivered in the **[Reference Data Folder]\SharedContent\Data\Translators\PDMSS3DImport\ConfigurationFiles\Bulkloadables** folder.
  - If the mapping file is read-only, then the software creates a copy of the mapping file with the name **<Mapping file name>\_COPY.xls**, and saves it in the same location as the original

mapping file. The software also updates the copy of the mapping file with the missing mapping details.

- After running the validation tool, you must bulk load the **CustomInterfaces** sheet from the PDMSPropertySchemaDefinition.xls workbook into the Smart 3D catalog. This bulkload is required to add the PMDS interfaces to the Smart 3D catalog and to update the Smart 3D property dialog boxes with the PDMS category.
  - By default, after validation, all missing attributes in the mapping sheet are listed after the **End** statement with an exclamation mark ("!"). Before you bulk load the PDMSPropertySchemaDefinitionWorkbook.xls workbook, delete the "!" marks from the missing attributes, and move the required rows between the **Start** and **End** statements.
- After running the validation tool, the PDMSS3DImportMapping.xml workbook displays all missing entries in the following colors:
  - **Red** - The component does not match any mapped components or patterns.
  - **Yellow** - The component does not match any mapped components, but matches with a pattern instead. Entries highlighted in yellow are treated as warnings. See the log file for more information.

## **PDMS Properties Extractor Dialog Box**

### **Data File**

Specifies the datafile for which the schema definition file and the mapping file requires validation. Type the name and full path location of the datafile. Alternatively, click **Browse** , and navigate to the datafile. The software automatically selects an .att file if you select a routing discipline for validation.

**NOTE** The .att file name must be the same as the .dtl file name. Both files must be in the same folder.

### **Schema Definition File**

Specifies the PDMS property schema definition file. Type the name and full path location of the file. Alternatively, click **Browse** , and navigate to the appropriate file.

### **Import Mapping File**

Specifies the mapping file to validate. Type the name and full path location of the mapping file. Alternatively, click **Browse** , and navigate to the file.

### **Validation Criteria**

Specifies the disciplines to validate. After validation, the selected object types are updated in the schema definition file and the mapping file. For more information, see *PDMS Import Validation* (on page 85).

### **Validate**

Runs the **PDMS Import Validation** command based on the specified criteria.

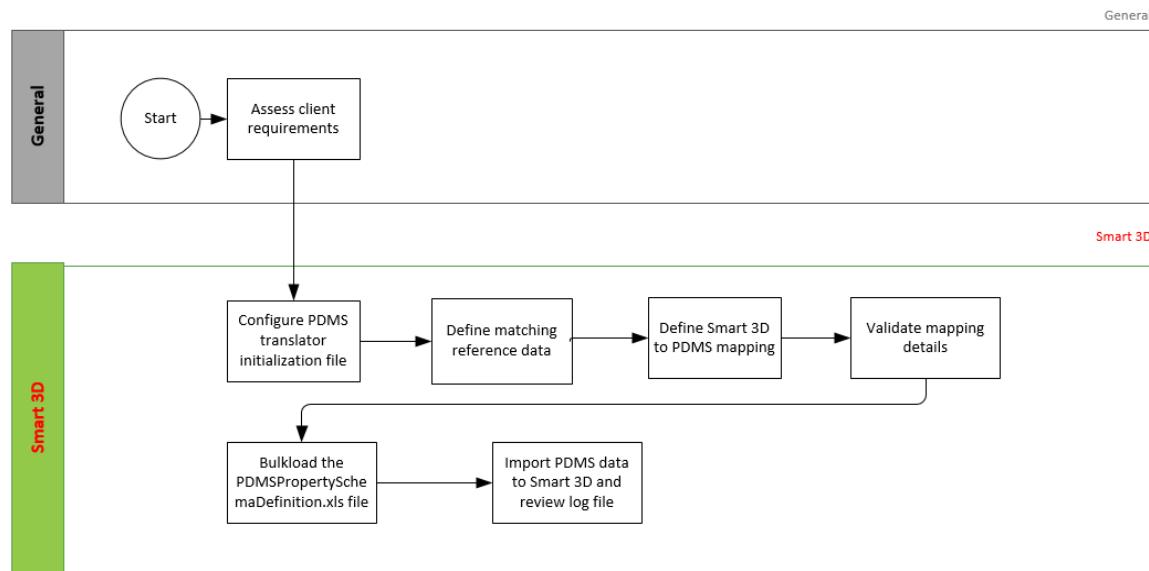
### **Cancel**

Closes the dialog box without performing the validation process.

## View Log

Displays the status log file after the validation process completes.

## Bulk load the database



After running the validation tool, you must bulkload the **CustomInterfaces** sheet in the **PDMSPropertySchemaDefinition.xls** workbook into the Smart 3D catalog. This bulkload is required to add the PMDS interfaces to the Smart 3D catalog, and to update the Smart 3D property dialog boxes with the PDMS category.

### ★ IMPORTANT

- Perform this procedure on a computer with the Bulkload utility and Server Connectivity component installed. Log on with a user name that has database administrator privileges. For more information about necessary components, see the *Intergraph Smart™ 3D Installation Guide*. You can access the installation guide using the **Help > Printable Guides** command.
- Close all Excel workbooks before starting the bulkload. Do not open Excel during the bulkload process.

1. Click **Start > Programs > Intergraph Smart 3D > Database Tools > Bulkload Reference Data**.  
*The Bulkload utility appears.*
2. In the **Excel files** box, click **Add** and navigate to the **PDMSPropertySchemaDefinition.xls** workbook.

**◆ TIP** By default, the workbook is delivered to the *[Reference Data Folder]\SharedContent\Data\Translators\PDMSS3DImport\ConfigurationFiles\Bulkloadables* folder.

3. In the **Excel codelist files** box, click **Add** and navigate to the PDMSPropertyCodeLists.xls workbook.

#### 💡 TIPS

- By default, the workbook is delivered to the *[Reference Data Folder]\SharedContent\Data\Translators\PDMSS3DImport\ConfigurationFiles\Bulkloadables* folder.
- You must specify a workbook in this box if you are modifying the delivered codelist. In all other cases, you are not required to populate this box.

4. Under **Bulkload mode**, select **Append to existing catalog** to add the new data to an existing database.
5. In the **Database server name** list, select the server on which the catalog database resides.
6. In the **Database name** list, select the name of the catalog database that you want to update with the new reference data.
7. Select the Catalog Schema database name in the **Schema database name** box.
8. In the **Log file box**, click **Browse**  to specify the name and location of the log file.

#### 💡 TIPS

- The default location for the log file is *[Product Folder]\CatalogData\BulkLoad\DataFiles*, but you can change this location.
- You must have write privileges to the folder in which you are saving the log file.
- The log file name must not contain any special characters. However, you can use the back slash when specifying a UNC path to a log file.
- You must use the file extension .log for the log file.

9. Click **Load**.

*The software updates the catalog database with the required data. You can see progress messages in the status bar of the Bulkload utility as the bulkload operation runs.*

10. Open the log file to check for any errors or warnings in the bulkloading process. You can quickly scan the **Error Analysis** section at the end of the log file to check for errors.
11. Click **Close**.

#### 💡 NOTES

- You can modify the Excel workbooks, and then bulk load them again to correct errors.
- Create a new log file for each bulkload operation, instead of overwriting the existing one. Check the log file for errors after each bulkload operation.
- For more information about using the Bulkload utility, see *Loading Reference Data into the Catalog* in the *Smart 3D Reference Guide* available with the **Help > Printable Guides** command.

## Export ACIS (File Menu)

**File > Export > ACIS** saves the selected wireframe and surface geometry data to a file in ACIS format. This command supports the output of geometry to a file but not object properties.

## Export Compartment

The **File > Export > Compartment** command exports a compartment solid body as a .sat file.

**NOTE** This command is only available in the Compartmentation task, when you have selected a single compartment.

1. In the Compartmentation task, select a compartment.
2. Click **File > Export > Compartment**.
3. Browse to the location where you want to save the .sat file.
4. Name the file.
5. Click **Save**.

## Export Grids

The **File > Export > Grids** command exports the coordinate system to an XLS or XML file. The exported file contains all needed information to import the coordinate system into a different model. All the distance and angle values are exported with the **Units** and **Precision** as set in **Tools > Options... > Units of Measure** window.

### Topics

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### Export coordinate system

1. Select **Tasks > Grids**.
2. Click **File > Export > Grids**.
3. In the **Export Grids** dialog box, select one or more coordinate systems from the list of available systems.
4. Browse to a folder to save the export file, and give the file a name that ends with an XLS or XML extension.
5. Specify a location for the export process log file.
6. Click **Export**.

*A progress bar displays at the bottom of the dialog box.*

7. After the export process is complete, click **View** to see the export file.

## **General Tab (Export Grids Dialog Box)**

Specifies which grid systems to export to a user-defined location.

### **Select coordinate systems to be exported**

Specifies one or more coordinate systems from the list of all available systems.

#### **Select All**

Selects all coordinate systems in the list.

#### **Clear All**

Selects none of the coordinate systems in the list.

### **Export file location**

Allows you to choose a location for the export file. You must give the file a name with either an XLS or XML extension.

### **Export log location**

Allows you to choose a location for the export process log file.

### **View**

Displays the file after the export process has completed.

### **Export**

Begins the export process.

### **Cancel**

Exits the **Export Grids** dialog box.

## **Settings Tab (Export Grids Dialog Box)**

Specifies settings for the export process.

### **Include Custom Attributes**

Retains custom attribute settings during the export process.

## Export IGES (File Menu)

**File > Export > IGES** saves the selected wireframe and surface geometry data to a file in IGES format. This command supports the output of geometry to a file but not object properties. You must have a license for IGES in order to use this command.

### **Export ACIS and IGES Data**

1. Select the data that you want to export.
2. Click **File > Export > ACIS** or **File > Export > IGES**, depending on what type of data to export.  
**TIP** You must have an IGES license in order to export IGES data.
3. Browse to locate the file.
4. Click **Save**.

**NOTE** A log file is saved in the folder where the export file resides.

## Export Neutral/GeniE XML (File Menu)

**File > Export > Neutral/GeniE Export** saves the model data to a neutral or GeniE XML format. For neutral XML, data from the following types of objects are exported:

- Plate systems
- Bracket systems
- Profiles systems, which include beam systems, profile edge reinforcement systems, and stiffener systems.
- Member systems
- Openings
- Compartments
- Loadings
- Coordinate systems

For GeniE XML, data from the following types of objects are exported:

- Plate systems
- Bracket systems
- Profiles systems, which include beam systems, profile edge reinforcement systems, and stiffener systems
- Member systems
- Openings
- Slabs
- Equipment
- Equipment foundations
- Footings

- Ladders
- Stairs
- Hand rails
- Analysis loads
- Load cases
- Load combinations

### ■ NOTES

- The deactivated plate and stiffener leaf systems are skipped during export.
- Export to neutral output requires a S3N license key installed on the License server.
- Export to GeniE output requires a S3G license key installed on the License server.

This command uses two Microsoft Excel workbooks. For neutral schema output, the command uses the ExportAttributeMapping.xls workbook. By default, this workbook is delivered to the *[Reference Data Folder]\SharedContent\Data\TranslatorsMarine\AttributeMapFile* folder. For GeniE output, the command uses the S3DGeniEExportMapping.xls workbook, which is delivered to the *[Reference Data*

*Folder]\SharedContent\Data\TranslatorsMarine\AttributeMapFile* folder. Before you export model data to either format, you must modify the associated mapping worksheet to ensure that the required user interfaces and attributes are defined. For more information, see *Export Attribute Mapping Workbooks* (on page 99).

### Supported Versions of the GeniE Software

**Supported GeniE Version:** 7.2-07

*Export NSchema/GeniE Dialog Box* (on page 97)

### Export data to Neutral XML

★ **IMPORTANT** Export to Neutral XML output requires a S3N license key installed on the License server.

1. Click **File > Export > Neutral/GeniE Export**.  
*The Export NSchema/GeniE dialog box opens.*
2. Define the **Filter** for selection.
3. Select **Neutral** from the **Output format**.
4. Specify the type of plate systems that need to be exported, and the required file type under **External Geometry Export Options** section.

### ■ NOTES

- The **External Geometry Export Options** exports the selected plate systems geometry to the specified external file type. The remaining plate systems geometry is exported to the output XML file.
- If you select **Imported** and **IGES**, the software exports all of the imported plate systems geometry to an IGES file format.

- If you select **All** and **IGES**, the software exports all of the plate systems geometry to an IGES file format.
- If you select **Non Planar** and **IGES**, the software exports all the non planar systems geometry to an IGES file format.
- If you select **Imported** and **ACIS**, the software exports all of the imported plate systems geometry to an ACIS file format.
- If you select **All** and **ACIS**, the software exports all of the plate systems geometry to an ACIS file format.
- If you select **Non Planar** and **ACIS**, the software exports all the non planar systems geometry to an ACIS file format.

5. Specify the name and location for the neutral XML file in the **XML file** box.
6. Specify the name and location for the neutral mapping file in the **Mapping file** box.
7. Specify the name and location for the log file in the **Log file** box.
8. Click **OK**.

**NOTE** After export finishes, click **View XML** to see the XML file. Click **View Log** to see the log file.

### **Export data to GeniE XML**

**IMPORTANT** Export to GeniE output requires a S3G license key installed on the License server.

1. Click **File > Export > Neutral/GeniE Export**.  
The Export NSchema/GeniE dialog box opens.
2. Define the **Filter** for selection.
3. Select **GeniE** from the **Output format**.
4. Specify the name and location for the GeniE XML file in the **XML file** box.
5. Specify the name and location for the GeniE mapping file in the **Mapping file** box.
6. Specify the name and location for the log file in the **Log file** box.
7. Click **OK**.

**NOTE** After export finishes, click **View XML** to see the XML file. Click **View Log** to see the log file.

### **Configure the GeniE export initialization file**

The GenieExportTranslator.ini file controls the export of model data to GeniE XML format. You can modify the default values to suit your specific project needs.

1. In Windows Explorer, browse to the following location:  
*[Reference Data Folder]\SharedContent\Content\Translators\Marine\S3DGeniEExport*
2. Open the *GenieExportTranslator.ini* file and modify the options as needed.
3. Save your changes.

 **NOTE** SharedContent is delivered in the reference data setup.

## ***GeniE Export Initialization File Global Options***

### **DeveloperLogging**

Controls the logging mode. The following values are available:

- **0** - Generates the log file in End User mode. This is the default.
- **1** - Generates the log file in Developer mode.

### **GeniEACISVersion**

Denotes the ACIS version that GeniE software expects. The following values are available:

- **16** - Creates embedded data in ACIS version 16 format. This is the default.
- **19** - Creates embedded data in ACIS version 19 format . You can give any ACIS version that GeniE can accept.

## ***Limitations of GeniE Export***

GeniE export has the following limitations:

1. GeniE does not import overlapped plates. Before you export to **GeniE.xml** file, verify that the plates are not overlapped.
2. Objects with duplicate names are not imported into GeniE. Verify that the objects names are unique before you export to the GeniE xml file.
3. GeniE export does not support surface loads.
4. GeniE does not support the concept of Slab and Layer. Slab is exported as a plate and the layer material with larger thickness is exported as plate material to GeniE.

## ***Export NSchema/GeniE Dialog Box***

Sets options for exporting model data to a neutral XML format.

## **General**

### **Filter**

Defines the filter used to determine which objects are exported.

### **Description**

Specifies a text description for the export.

### **Author**

Specifies the author assigned to the export.

### **Organization**

Specifies the organization assigned to the export.

## Output Format

### Neutral Schema

Indicates that the output XML is in the neutral format. Exporting to neutral schema output requires a **S3N** license key installed on the License server.

### Genie

Indicates that the output XML is in the GeniE format. Exporting to GeniE output requires a **S3G** license key installed on the License server.

## External Geometry Export Options

These options specify the type of plate systems to export to the selected file type.

### Plate Systems

#### Imported

Exports all of the imported plate systems geometry to the specified file type. The remaining plate systems geometry is exported to the output XML file.

#### All

Exports all of the plate systems geometry to the specified file type.

#### Non Planar

Exports all the non planar plate systems geometry to the specified file type. The planar plate systems geometry is exported to the output XML file.

### File Type

#### IGES

Outputs exported plate systems to an IGES file.

#### ACIS

Outputs exported plate systems to an ACIS file.

**NOTE** Plate System File options are not applicable for the GeniE output format. When you select **Genie**, these options are unavailable. By default, all the plate systems are exported to the GeniE XML file.

## Paths

### XML File

Specifies the name of and path to the XML file that is created during export.

### Mapping File

Specifies the name of and path to the mapping file that is used during export.

### Log File

Specifies the name of and path to the log file that is created during export.

### Browse

Uses the **Open** dialog box to select the path.

**OK**

Starts exporting to the XML file, and closes the dialog box.

**Cancel**

Cancels the command, and closes the dialog box.

**Apply**

Starts exporting to the XML file, but does not close the dialog box.

**View Log**

Displays the log file.

**View XML**

Displays the XML file.

## **Export Attribute Mapping Workbooks**

The **ExportAttributeMapping.xls** and **S3DGeniEExportMapping.xls** workbooks are used to define mapping attributes required for model data export. By default these files are delivered to the *[Reference Data Folder]\SharedContent\Data\TranslatorsMarine\AttributeMapFile* and *[Reference Data Folder]\SharedContent\Data\TranslatorsMarine\S3DGeniEExport* folders.

*ExportAttributeMapping.xls* (on page 99)

*S3DGeniEExportMapping.xls* (on page 103)

**See Also**

*Export Data to Neutral XML* (on page 95)

*Export NSchema/GeniE Dialog Box* (on page 97)

### **ExportAttributeMapping.xls**

The ExportAttributeMapping.xls workbook consists of all required types of translation mapping worksheets. Before you export Smart 3D model data, you must modify these mapping worksheets to ensure that all of the necessary criteria have been met.

#### **Worksheets**

##### **Index**

Provides an index of all the other sheets in the workbook.

##### **NSchemaMap**

Provides the main mapping sheet for neutral schema mapping. This sheet in turn refers to the other NSchema mapping sheets.

##### **Smart3DClassMap**

Maps the supported classes between Smart 3D and the neutral schema. This is the main mapping sheet for the neutral schema translation.

##### **CompartmentMap**

Maps structural compartment user attributes and interfaces between Smart 3D and the neutral schema.

**SpatialLoadingMap**

Maps structural spatial load user attributes and interfaces between Smart 3D and the neutral schema.

**UnitLoadingMap**

Maps structural unit load user attributes and interfaces between Smart 3D and the neutral schema.

**ModelDetailsMap**

Maps model details between Smart 3D and the neutral schema.

**ModelAdditionalAttributesMap**

Maps model additional model attributes between Smart 3D and the neutral schema.

**AdditionalAttributesMap**

Maps additional model attributes between Smart 3D and the neutral schema.

**PrincipalParticulars**

Maps principal particulars attributes between Smart 3D and the neutral schema.

**ThirdPartyDetailsMap**

Maps third party application details between Smart 3D and the neutral schema.

**ThirdPartyApplicationAttrMap**

Maps third party application attribute details between Smart 3D and the neutral schema.

**ThirdPartyAdditionalAttrMap**

Maps third party additional attribute details between Smart 3D and the neutral schema.

**ShipCrossSectionMap**

Maps the Smart 3D cross-section user attributes and interfaces between Smart 3D and the neutral schema.

**MemberSystemMap**

Maps the member system user attributes and interfaces between Smart 3D and the neutral schema.

**MemberPartMap**

Maps the member part user attributes and interfaces between Smart 3D and the neutral schema.

**DesignMemberPartMap**

Maps the design member part user attributes and interfaces between Smart 3D and the neutral schema.

**PlantCrossSectionMap**

Maps the Smart 3D cross-section attributes and interfaces between Smart 3D and the neutral schema.

**GlobalsMap**

Defines global settings for data export to the neutral schema.

**RootPlateSystemMap**

Maps the root plate system attributes and interfaces between Smart 3D and the neutral schema.

**LeafPlateSystemMap**

Maps the leaf plate system attributes and interfaces between Smart 3D and the neutral schema.

**RootProfileSystemMap**

Maps the root profile system attributes and interfaces between Smart 3D and the neutral schema.

**LeafProfileSystemMap**

Maps the leaf profile system attributes and interfaces between Smart 3D and the neutral schema.

**RootBracketSystemMap**

Maps the root bracket system attributes and interfaces between Smart 3D and the neutral schema.

**LeafBracketSystemMap**

Maps the leaf bracket system attributes and interfaces between Smart 3D and the neutral schema.

**RootEdgeReinforcementSystemMap**

Maps the root edge reinforcement system attributes and interfaces between Smart 3D and the neutral schema.

**LeafEdgeReinforcementSystemMap**

Maps the leaf edge reinforcement system attributes and interfaces between Smart 3D and the neutral schema.

**RootBeamSystemMap**

Maps the root beam system attributes and interfaces between Smart 3D and the neutral schema.

**LeafBeamSystemMap**

Maps the leaf beam system attributes and interfaces between Smart 3D and the neutral schema.

**CoordinateSystemMap**

Maps the coordinate system attributes and interfaces between Smart 3D and the neutral schema.

**OpeningMap**

Maps the opening attributes and interfaces between Smart 3D and the neutral schema.

**Mapping Sheets Columns**

**Source Attribute**

Defines the Smart 3D object attribute to map.

**Target Attribute**

Defines the neutral schema attribute to which the Smart 3D attribute value is mapped.

**MapType**

Defines the map type of the attribute. Acceptable values are as follows:

- **NameDef** - Used when the value needs to be directly transferred. For example, there is an attribute named *Name* in the source system and the same attribute named *name* in the target system. Because both attributes have the same meaning, the value just needs to be transferred between the two systems. By default, if no **MapType** is specified, **NameDef** is used.
- **ValueDef** - Used when the value of an attribute needs to be mapped before it is transferred.
- **AdditionalAttributeDef** - Used when it is necessary to create new or additional attributes for the value of a given attribute.
- **PatternDef** - Used when any valid regular expression can be used to map the values.
- **CharacterDef** - Used to split the value of an attribute using a delimiter or character position and string length to generate new attributes.

**SheetName**

Defines the name of the sheet in the ExportAttributeMapping.xls workbook that contains additional mapping information related to the attribute, if any exists.

**Formula**

Defines the formula used to calculate the value of the attribute to mapped, if one is needed. For example, if the source system has an attribute Radius that needs to be mapped to the destination system's attribute Diameter, the software cannot substitute one value for the other. Instead the value used for Diameter results from the following calculation: Diameter = 2 \* Radius.

**Value**

Specifies the value of the neutral schema attribute.

**Label**

Specifies whether the Smart 3D attribute is a label. Type **TRUE/YES** or **FALSE/NO**. Entries can be in lowercase or uppercase.

**Ignore**

Specifies whether the item is ignored during export. Type **TRUE/YES** or **FALSE/NO**. Entries can be in lowercase or uppercase.

**Mapping Tips**

Use the labels in Smart 3D to map the direct properties of objects or the properties of the related objects such as traverse relationships.

The following steps illustrate how to export the structure member weight to the neutral schema xml file:

1. If a label is not available in the Catalog task, create a label that gives the **Structure Member Weight** of the placed member.

**NOTE** For more information about creating labels, see *Label Editor Command* in the *Catalog User's Guide*.

2. Open the **MemberPartMap** sheet in translation mapping file.

**NOTE** The **MemberPartMap** sheet is available in the **ExportAttributeMapping.xls** workbook. By default, the **ExportAttributeMapping.xls** workbook is available in the following location:

*[Reference Data Folder]\SharedContent\Content\TranslatorsMarine\AttributeMapFile.*

3. Map the Smart 3D Attribute to the corresponding Neutral Schema Attribute.
4. Type **TRUE** in the **Label** column.
5. Save the mapping file.

**NOTE** Label mapping is not applicable for GeniE export functionality.

## Hierarchical Mapping

The **ExportAttributeMapping.xls** workbook also supports hierarchical mapping between source and target systems. For example, if the source object has an attribute value called *web length* on a cross-section object using the following hierarchy:

IJUAXSectionWeb.WebLength

If the above hierarchy is matched with *Web.WebLength* on the target system, then you can directly map this hierarchy in the **Value** and **Target Attribute** columns.

**NOTE** This hierarchical mapping is applicable until a child item is a direct attribute on its parent.

## S3DGeniEExportMapping.xls

This workbook contains mapping for both neutral schema and GeniE export. That is, it contains all the sheets of the **ExportAttributeMapping.xls** workbook and the mapping sheets needed for GeniE export. In the existing sample mapping sheets, you can add new mapping entries.

### Worksheets

#### Index

Provides an index of all the other sheets in the workbook. It describes all other sheets in the workbook.

#### GeniEMap

Provides the main mapping sheet for GeniE mapping. This sheet in turn refers to the other GeniE mapping sheets.

#### GeniEClassMap

Maps the supported structure classes between Smart 3D and GeniE export. This is the main mapping sheet for the GeniE translation.

#### GeniEGlobalsMap

Defines global settings for data export to GeniE Schema.

**StraightMemSystemAttrsMap**

Maps the straight member system attributes and interfaces between the neutral and GeniE schemas.

**CurvedMemSystemAttrsMap**

Maps the curved member system attributes and interfaces between the neutral and GeniE schemas.

**StraightMemPartAttrsMap**

Maps the straight member part attributes and interfaces between the neutral and GeniE schemas.

**CurvedMemPartAttrsMap**

Maps the curved member part attributes and interfaces between the neutral and GeniE schemas.

**StraightStiffenerSysAttrsMap**

Maps the straight stiffener system attributes and interfaces between the neutral and GeniE schemas.

**CurvedStiffenerSysAttrsMap**

Maps the curved stiffener system attributes and interfaces between the neutral and GeniE schemas.

**StraightERSysAttrsMap**

Maps the straight edge reinforcement system attributes and interfaces between the neutral and GeniE schemas.

**CurvedERSysAttrsMap**

Maps the curved edge reinforcement system attributes and interfaces between the neutral and GeniE schemas.

**BeamSysAttrsMap**

Maps the beam system attributes and interfaces between the neutral and GeniE schemas.

**MaterialMap**

Maps the material attributes and interfaces between the neutral and GeniE schemas.

**ApplicationDetailsMap**

Maps the application details between the neutral and the GeniE schemas.

**UnitsNameMap**

Maps the unit names and interfaces between the neutral and GeniE schemas.

**UnitsMap**

Maps the unit attributes and interfaces between the neutral and GeniE schemas.

**FlatBarXSectionMap**

Maps the flat bar cross-section attributes and interfaces between the neutral and GeniE schemas.

**AngleXSectionMap**

Maps the angle cross-section attributes and interfaces between the neutral and GeniE schemas.

**GeneralXSectionMap**

Maps the generic cross-section attributes and interfaces between Neutral and GeniE Schema.

**IXSectionMap**

Maps the I-cross-section attributes and interfaces between the neutral and GeniE schemas.

**ChannelXSectionMap**

Maps the channel cross-section attributes and interfaces between the neutral and GeniE schemas.

**TubeXSectionMap**

Maps the tubular cross- section attributes and interfaces between the neutral and GeniE schemas.

**BoxXSectionMap**

Maps the box cross-section attributes and interfaces between the neutral and GeniE schemas.

**XSectionAdditionalAttrMap**

Maps the cross-sectional additional attributes and interfaces between the neutral and GeniE schemas.

**SlabAttrsMap**

Maps the slab attributes and interfaces between the neutral and GeniE schemas.

**FlatPlateSysAttrsMap**

Maps the flat plate system attributes and interfaces between the neutral and GeniE schemas.

**CurvedPlateSysAttrsMap**

Maps the curved plate system attributes and interfaces between the neutral and GeniE schemas.

**EquipmentAttrsMap**

Maps the equipment attributes and interfaces between the neutral and GeniE schemas.

**EqpFoundationAttrsMap**

Maps the equipment foundation attributes and interfaces between the neutral and GeniE schemas.

**FootingAttrsMap**

Maps the footing attributes and interfaces between the neutral and GeniE schemas.

**StairAttrsMap**

Maps the stair attributes and interfaces between the neutral and GeniE schemas.

**LadderAttrsMap**

Maps the ladder attributes and interfaces between the neutral and GeniE schemas.

**HandRailAttrsMap**

Maps the hand rail attributes and interfaces between the neutral and GeniE schemas.

**LoadCaseAttrMap**

Maps the load case attributes and interfaces between the neutral and GeniE schemas.

**LoadCombinationAttrMap**

Maps the load combination attributes and interfaces between the neutral and GeniE schemas.

**PointLoadAttrMap**

Maps the point load attributes and interfaces between the neutral and GeniE schemas.

**UDLAttrMap**

Maps the UDL load attributes and interfaces between the neutral and GeniE schemas.

**Mapping Sheets Column Description****Source Attribute**

Defines the neutral schema attribute to be mapped.

**Target Attribute**

Defines the GeniE schema attribute to which the neutral schema attribute value is mapped.

**MapType**

Defines the map type of the attribute. Acceptable values are as follows:

- **NameDef** - Used when the value needs to be directly transferred. For example, there is an attribute named *Name* in the source system and same attribute named *name* in the target system. Because both attributes have the same meaning, the value just needs to be transferred between the two systems. By default, if no **MapType** is specified, **NameDef** is used.
- **ValueDef** - Used when the value of an attribute needs to be mapped before it is transferred.
- **AdditionalAttributeDef** - Used when it is necessary to create new or additional attributes for the value of a given attribute.
- **PatternDef** – Used when any valid regular expression can be used to map the values.
- **CharacterDef** - Used to split the value of an attribute using a delimiter or character position and string length to generate new attributes.

**SheetName**

Defines the name of the sheet in the ExportAttributeMapping.xls workbook that contains additional mapping information related to the attribute, if any exists.

**Formula**

Defines the formula used to calculate the value of the attribute to mapped, if one is needed. For example, if the source system has an attribute Radius that needs to be mapped to the

destination system's attribute Diameter, the software cannot substitute one value for the other. Instead the value used for Diameter would result from the following calculation:  
Diameter = 2 \* Radius.

#### Value

Specifies the value of the neutral schema attribute.

#### Label

Specifies whether the Smart 3D attribute is a label. Type **TRUE/YES** or **FALSE/NO**. Entries can be in lowercase or uppercase.

#### Ignore

Specifies whether the item is ignored during export. Type **TRUE/YES** or **FALSE/NO**. Entries can be in lowercase or uppercase.

### Hierarchical Mapping

The **S3DGenIEExportMapping.xls** workbook also supports hierarchical mapping between source and target systems. For example, if the source object has an attribute called COG on Equipment using the following hierarchy:

EquipmentProperties.Physical.DryCoG.Point3D.X

And if the above hierarchy is matched with cog.x on the target system, then you can directly map this hierarchy in the **Source Attribute** and **Target Attribute** columns.

 **NOTE** This hierarchical mapping is applicable until a child item is a direct attribute on its parent.

## Export Structure

The **File > Export > Structure** command exports the structural physical model to a CIS/2 or IFC file. For more information, see Importing and Exporting Structure.

### Exporting User-defined Properties

You can map user-defined Smart 3D properties to third-party software attributes and export those properties/attributes to the CIS/2 file using the UserAttribute\_Map.xml file. A sample UserAttribute\_Map.xml file is delivered with Smart 3D in the *[Product Folder]\SmartPlantStructure\Symbols\StructureImportExportMaps* folder.

### Export Structure Model

1. Click **File > Export > Structure**.
2. Select the filter to use to select the objects to export.
3. Type a description.
4. Type your name in the **Author** box and your company name in the **Organization** box.
5. Specify the file name and folder for the export file.
6. Define a mapping file, if needed. For more information on mapping files, see *New Mapping File* (on page 75).
7. Define a log file name and folder.

---

8. Click **OK**.

**NOTES**

- You must create the filter before you can export the physical model.
- You can create a mapping file using the **File > New Mapping File Command** that can be used when exporting the physical model.
- You can also use the delivered mapping files located in the *[Product Folder]\SmartPlantStructure\Symbols\StructureImportExportMaps* folder.

## **Export Structure Dialog Box**

Controls how objects are written to the export file. You can export to the CIMsteel Integration Standards 2.0 (CIS/2) or to the Industry Foundation Class (IFC) file format.

**NOTES**

- You can export only concrete objects such as slabs, walls, structural systems, openings on slabs and walls, footings, equipment foundations, and design equipment (with an equipment classification of civil elements or structural elements) to the IFC format.
- Linear and curved concrete members cannot be exported to IFC. We recommend the CIS/2 format for transferring linear and curved members.
- The International System of Units (SI) is used in the exported CIS/2 file regardless of the settings on the **Tools > Options > Units of Measure** tab.

If you have any questions about using this translator, please contact Intergraph Support. You can find support information on our web site: <http://support.intergraph.com>.

Be sure to check the Compatibility Matrix before you export data. Open <https://smartsupport.intergraph.com> <https://smartsupport.intergraph.com>, select **View Downloads** at the top, and then select **Product Compatibility** under **Useful Links** on the right.

### **Export Standard**

Select the industry standard to export.

### **IFC Options**

Defines data, display, and organizational information for the IFC file. For more information, see *Export Options Dialog Box* (on page 109).

### **Filter**

Select the filter to use to identify the model objects to export.

### **Description**

Type a description of the model. This description is included in the export file.

### **Author**

Specifies the person who created the export file. The default is the current system user name.

### **Organization**

Specifies your company or organization name to use in the export file.

**Export file**

Define the file name and folder path of the export file to write. CIS/2 files have a .stp extension while IFC files have an .ifc extension.

**Include mapping file**

Select this option to use a mapping file when exporting the members to the CIS/2 file. You use a mapping file to:

- Swap the third-party software name for a section (for example, L3.5X2.5X1/4) with the Smart 3D name for a section (for example, L3-1/2X2-1/2X1/4). You must create the section mapping file using the **File > New Mapping File Command** before you can use the mapping file in this command. Sample mapping files for the FrameWorks Plus AISC table are delivered with the software in the *[Product Folder]\SmartPlantStructure\Symbols\StructureImportExportMaps* folder. For more information, see *New Mapping File* (on page 75).
- Swap the third-party material and material grade name with the Smart 3D name. A sample material mapping file for AISC is delivered with the software in the *[Product Folder]\SmartPlantStructure\Symbols\StructureImportExportMaps* folder.
- Specify the user-attributes that need to be exported and to swap the Smart 3D property names with the third-party user-attributes (properties) names. A sample user attribute mapping file is delivered with the software in the *[Product Folder]\SmartPlantStructure\Symbols\StructureImportExportMaps* folder.

**Mapping file**

Specify the mapping file to use if **Include mapping file** option is selected.

**Log file**

Specify a log file name. You can view the log file by clicking **View Log**.

**Submit Job**

Activates the **Schedule [Task]** dialog box, which is used to define the batch export of files using SmartPlant Batch Services. For more information on the batch settings, see *Schedule [Task] Dialog Box* (on page 74).

**View Log**

Displays the export log file. You must click **Apply** when exporting to view the log at the end of processing. If you click **OK**, the dialog box is closed at the end of processing, and you are not able to click **View Log**.

***Export Options Dialog Box***

Defines properties for the IFC file and the data contained in the export file.

*Data Tab (IFC Export Options Dialog Box)* (on page 109)

*Presentation Tab (IFC Export Options Dialog Box)* (on page 110)

*Organization Tab (IFC Export Options Dialog Box)* (on page 110)

***Data Tab (IFC Export Options Dialog Box)***

Specifies the properties for the format and accuracy of the data contained in the export file.

### **Boundary Representation (Brep)**

Objects are represented by a series of faces that the software stitches together. For example, a design solid is exported as one object with a series of faces.

### **Constructive Solid Geometry (CSG)**

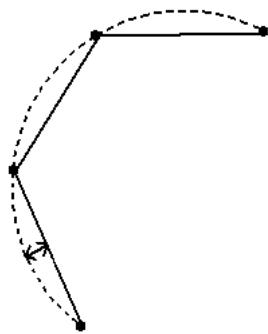
Objects are represented by a series of solids (cylinders, cubes, and so forth) that the software constructs to create the entire solid. This option only applies to design solids. All other solids (slabs, walls, footings, and so forth) are always written out in boundary representation format.

### **Include Object's Range**

Select to include the overall range of an entity in addition to the geometry of each of their components. In general, the entities do not have representation (footings and foundations).

### **Tessellation or Stroking Tolerance**

Specifies the accuracy to use when tessellating nonplanar surfaces or stroking nonlinear curves.



### **Presentation Tab (IFC Export Options Dialog Box)**

These properties specify how exported objects should render in other software.

#### **Slab**

Select a color for slabs.

#### **Wall**

Select a color for walls.

#### **Footing**

Select a color for footings.

#### **Foundation**

Select a color for foundations.

#### **Design Solid**

Select a color for foundations.

### **Organization Tab (IFC Export Options Dialog Box)**

These properties give a brief description about the organization that owns the data and is used in the IfcOrganization element.

**Name**

Type the name of the organization.

**Role**

Select the role played by the organization.

**Description**

Type a brief description of the organization.

**Role Description**

Give a detailed description about the organization and the role it plays. If **Role** is set to **User-defined**, then this field is required.

**Address**

Specify the address information of the organization.

## Export Smart 3D Models to PDMS

The **File > Export > PDMS Datal Export > Export Model** command exports model data from Smart 3D for subsequent import into PDMS. The process involves transferring Smart 3D objects and their attribute values to PDMS's native DATAL file format. For information about the types of Smart 3D model data that you can export to PDMS, see [Exporting Smart 3D Model Data](#).

**★IMPORTANT** Include first level objects when exporting Smart 3D model data to PDMS: Equipment, Pipeline, Duct Run, Cableway/Cable tray/Conduit run, Member systems/Root plate system, and Support assembly.

Prior to using the export to PDMS functionality, you must perform the following tasks:

1. Ensure that the Smart 3D and PDMS catalogs are set up properly. For more information, see [Set up the PDMS and Smart 3D Catalogs](#).
2. Edit the options in the delivered initialization file to define the parameters used in the export process. For more information about the initialization file, see [Configure the PDMS export initialization file](#).
3. Edit the mapping workbooks to reflect the customizations that you have made to the Smart 3D model object attributes. For more information about the mapping worksheets, see [Appendix: Smart 3D Export to PDMS Workbook](#).
4. Ensure that the mapping and INI (PDMSExportTranslator.ini) files are in the same file path before exporting model data to PDMS.
5. Use the **PDMS Export Validation** command to validate the mapping details that you have defined. For more information, see [PDMS Export Validation](#).

### [Export Model to PDMS Datal Dialog Box \(on page 116\)](#)

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#### What do you want to do?

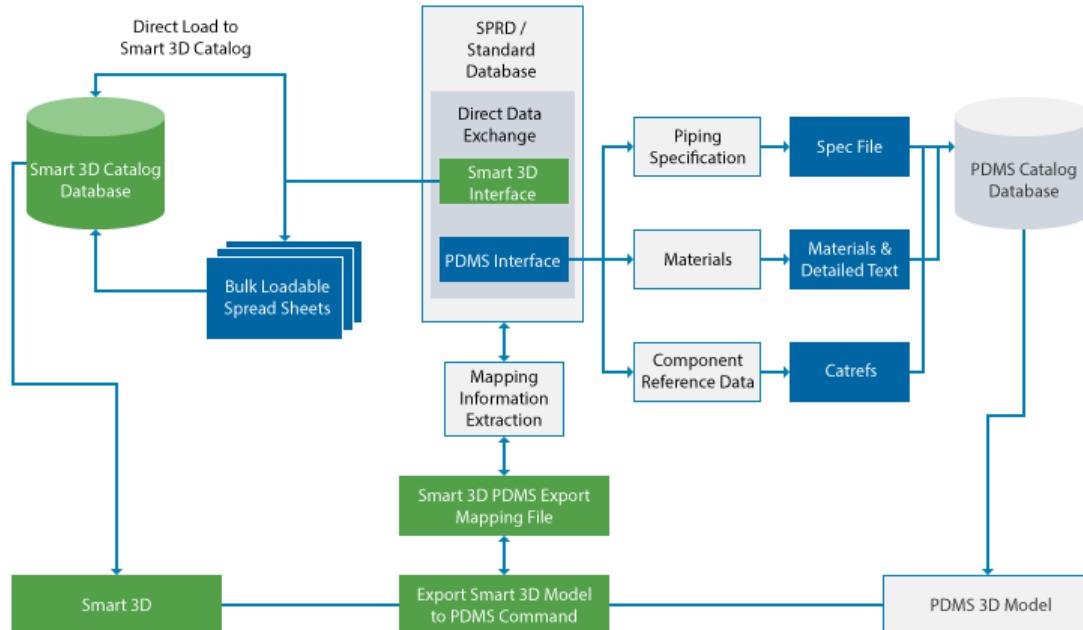
- *Generate catalog and reference data in Smart 3D and PDMS formats for export (on page 112)*
- *Export Smart 3D model data to PDMS (on page 115)*

---

## Generate catalog and reference data in Smart 3D and PDMS formats for export

You can extract piping catalogs and reference data in Smart 3D and PDMS formats, and associate the mapping between the two formats. You can generate piping catalog and reference data simultaneously in either of the formats. The flow diagram below illustrates the parallel generation process for PDMS export.

**NOTE** You must have a SmartPlant Materials 2011 (7.0.5) license to extract piping specifications from the standard database (SDB).



### Load piping specification from SDB into Smart 3D catalog

Piping specification and component data can be exported from the standard database to Microsoft Excel workbooks, and then bulkloaded into the catalog or they can be exported directly to the Smart 3D catalog database. For more information on the integration procedure, see *SmartPlant Reference Data Smart 3D Interface User's Guide* which is delivered with the SmartPlant Materials software.

### Extract piping specification data from SDB/SPRD in PDMS format

Any piping specification data can be extracted in PDMS format from the standard database. Extracted specification data can be loaded into the PDMS catalog using PDMS PARAGON/SPECON modules. For more information on the integration procedure, see *SmartPlant Reference Data PDMS Interface User's Guide*, which is delivered with the SmartPlant Materials software.

### Load SDB specification data into PDMS catalog

When the piping specification is extracted from the SDB in PDMS format, piping specification data generates materials, detailed text, specification, and component CATRef link files. These

files should be loaded into the PDMS catalog in the order specified below using PDMS PARAGON/SPECON modules. For more information on the integration procedure, see *SmartPlant Reference Data PDMS Interface User's Guide*, which is delivered with the SmartPlant Materials software.

PDMS format files to load	Loading order
Materials file	1
Detailed text file	2
Specification file	3
Component CATRef link file	4

 **TIP** PDMS does not allow the materials and detailed text to be loaded if the line count in the above generated files is more than 5000.

## NOTES

- Before loading the specification files ensure that the materials and detailed text files exist in PDMS catalog.
- PDMS administrators need to make arrangements to load the component/dimensional data into PDMS catalog.
- You cannot use loaded specification files from PDMS unless all of the component/dimensional data along with the point sets and geometry sets are generated for the specification. Also, ensure that the SCOMs are created in PDMS before the Component CATRef link file is run.
- SmartPlant Reference Data integration does not transfer instruments and specialties in SDB to PDMS. You need to manually transfer and create appropriate mapping between instruments and specialties.

## Extract mapping information between Smart 3D and PDMS piping data

The extracted mapping data between Smart 3D and PDMS piping data can be used in the **S3DPDMSExportmapping.xls** workbook. You can also use this workbook to export PDMS data. To extract a mapping file in .xls format, use the **Company Menu > CO.SD SDB-Tools > COM.PX.02.02 Export PDMS/SP3D-Data** standard database tools. Mapping configuration also generates additional data related to size independent commodity codes used in either tool, so that the additional data can be used to generate dimensional data for components in PDMS.

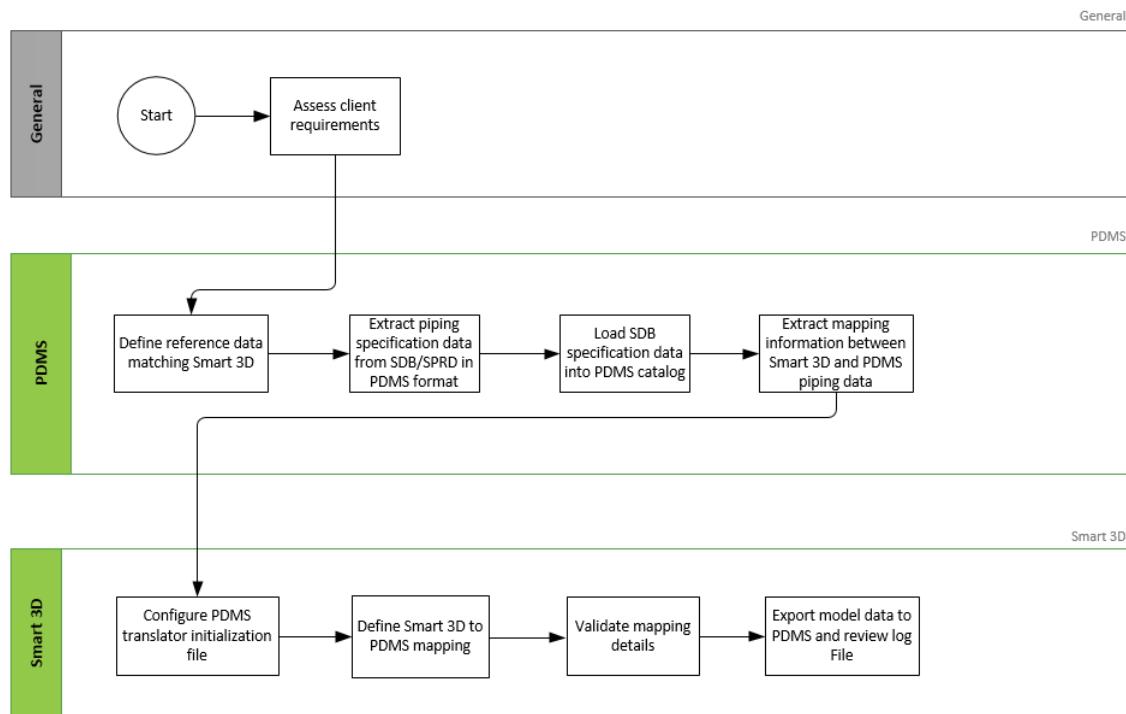
The screenshot shows a Microsoft Excel spreadsheet with the title bar 'COMPX0202\_37278.xls [Compatibility Mode] - Microsoft Excel'. The spreadsheet contains a table with the following columns:

A	B	C	D	E	F
Use a "!" To comment out entire line	SP3D Value	PDMS Value	PDMS Catref	SP3D Commodity Code	MapType
Start					
4	010CA01B1-45 Degree Direction Change-1-15-15	*/I3666751	BE4LDCCBEDCHAAA	BE4LDCCBEDCHAAA	
5	010CA01B1-45 Degree Direction Change-1-20-20	*/I3666759	BE4LDCCBEDCHAAA	BE4LDCCBEDCHAAA	
6	010CA01B1-45 Degree Direction Change-1-25-25	*/I3666762	BE4LDCCBEDCHAAA	BE4LDCCBEDCHAAA	
7	010CA01B1-45 Degree Direction Change-1-32-32	*/I3666765	BE4LDCCBEDCHAAA	BE4LDCCBEDCHAAA	
8	010CA01B1-45 Degree Direction Change-1-40-40	*/I3666768	BE4LDCCBEDCHAAA	BE4LDCCBEDCHAAA	
9	010CA01B1-45 Degree Direction Change-1-50-50	*/I3666771	BE4LDCCBEDCHAAA	BE4LDCCBEDCHAAA	
10	010CA01B1-45 Degree Direction Change-1-65-65	*/I3666774	BE4LDCCBEDCHAAA	BE4LDCCBEDCHAAA	
11	010CA01B1-45 Degree Direction Change-1-90-90	*/I3666777	BE4LDCCBEDCHAAA	BE4LDCCBEDCHAAA	

**NOTE** Mapping information can be extracted for each component per specification with corresponding Idents and size independent Smart 3D commodity codes along with its Idents that can be used in PDMS.

**TIP** Remove \*/ from the PDMS value when appending the mapping information to the **S3DPDMSExportmapping.xls** workbook.

## Export Smart 3D model data to PDMS



**★ IMPORTANT** Prior to exporting Smart 3D data to PDMS, verify that all of the required mapping is completed and that both catalogs are set up appropriately. For more information about mapping and setting up the catalog, see Appendix: Smart 3D Export to PDMS Workbook and Define matching reference data, respectively.

1. In the Smart 3D Common task, click **File > Export > PDMS Data Export > Export Model**.  
The **Export Model to PDMS Data** dialog box displays.
2. Select the filter to use for selecting the objects to export.
3. Type a description of the model.
4. Type your name in the **Author** box and your company name in the **Organization** box.
5. Specify the name and full path location of the output DATAL file.
6. Navigate to the mapping file to use in the export process.
7. Specify the name and full path location for the log file.
8. Click **OK** to start the export process.

*When processing completes, the dialog box closes.*

**† TIP** If you click **Apply** instead of **OK**, the dialog box remains open when processing completes so you can click **View Log** to open the log file. Otherwise, you must manually navigate to the log file.

---

9. Review the log file for errors and warnings.

#### NOTES

- You must create the filter before you can export the model objects. Otherwise, the export process might fail.
- The mapping file is a Microsoft Excel workbook that is used to map all the objects and their properties in Smart 3D and PDMS. This workbook is delivered to the *[Reference Data Folder]\SharedContent\Translators\S3DPDMSExport* folder during setup.
- If you want the software to create a separate datafile for each discipline, you must select **Generate separate file for each discipline**.
- To export profile parts when working in Marine mode, the plate parts that connect to the profile parts must be selected in the filter.

### **Export Model to PDMS Datafile Dialog Box**

Provides options that control how Smart 3D model objects are written to the PDMS output datafile.

If you have any questions about using this translator, please contact Intergraph Support. You can find support information on our web site at <http://support.intergraph.com>.

#### **Filter**

Specifies the filter to use to identify the model objects for export.

#### **Description**

Specifies a description of the model. The description you enter is included in the output DATAFILE file.

#### **Author**

Identifies the person who creates the output DATAFILE.

#### **Organization**

Specifies the company or organization name to use in the output DATAFILE.

#### **Datafile**

Defines the file name and folder path of the output DATAFILE to write. The DATAFILE file is a native file format for PDMS.

#### **Mapping file**

Indicates the mapping file to use in the export process. The mapping file is a Microsoft Excel workbook that is used to map all the objects and their properties in Smart 3D and PDMS. For more information, see Appendix: Smart 3D Export to PDMS Workbook.

#### **Log file**

Specifies a name for the log file. You can view the log file at the end of processing by clicking **View Log**.

 **NOTE** **View Log** is available only if you click **Apply** to begin the export process.

#### **Generate separate file for each discipline**

Creates a separate output DATAFILE file for each discipline. Exporting Smart 3D model data by

discipline reduces DATA1 file size and assists in identifying and resolving export issues.

**OK**

Exports the data as specified and closes the **Export Model to PDMS Data1** dialog box.

**Apply**

Exports the data as specified without closing the **Export Model to PDMS Data1** dialog box.

**Cancel**

Cancels the operation and closes the **Export Model to PDMS Data1** dialog box.

**View File**

Opens the output DATA1 file for viewing.

**View Log**

Displays the export log file. To view the log file, you must click **Apply** to begin the export process. If you click **OK**, the dialog box closes at the end of processing and **View Log** is unavailable.

**See Also**

*Export Smart 3D model data to PDMS* (on page 115)

## PDMS Export Validation

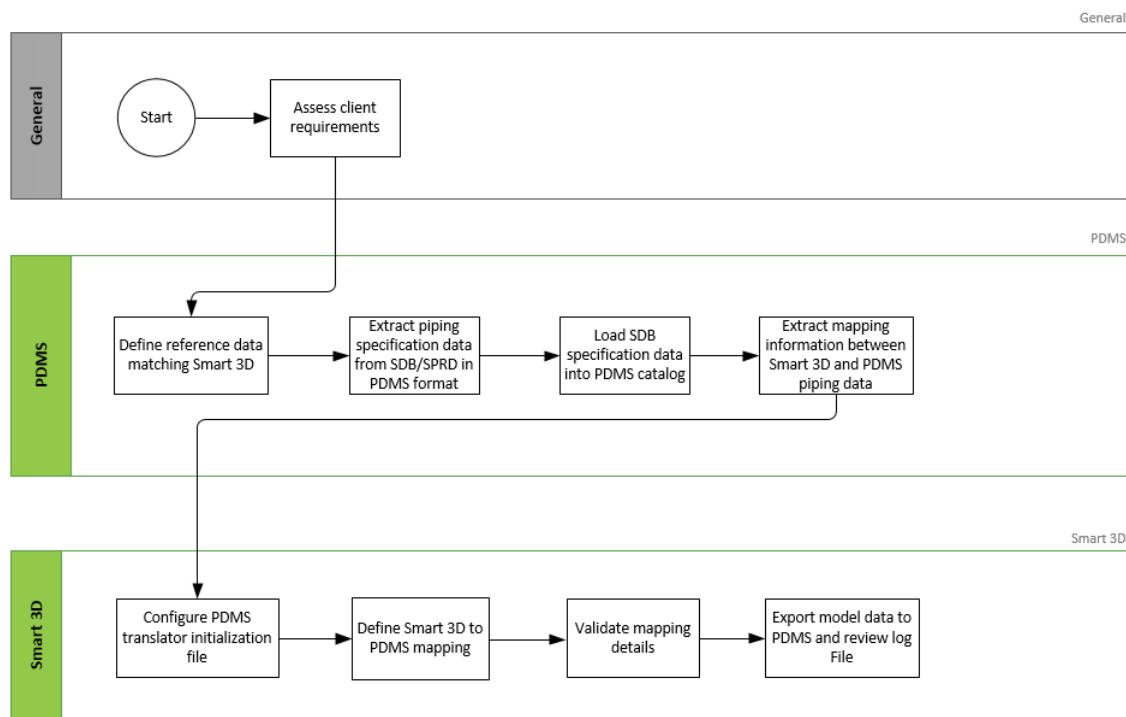
The **File > Export > PDMS Data Export > PDMS Export Validation** command validates the mapping data that you have defined in the **S3DPDMSExportMapping.xls** workbook. This command uses a set of user-specified criteria to locate missing mapping details, and then updates the mapping file as follows:

- Creates a worksheet named **Smart 3D Objects-Missing Mapping** in the **S3DPDMSExportMapping.xls** workbook. This sheet lists the missing mapping information.
- Updates individual worksheets with missing mapping information. For easy identification, the software highlights any updated cell in red.

The results of the validation process are also written to a log file.

*PDMS Export Validation Dialog Box (on page 119)*

### Validate mapping details



**★IMPORTANT** Close the mapping file before running the **PDMS Export Validation** command. To avoid errors, the mapping file must remain closed during the validation process.

1. Click **File > Export > PDMS Data Export > PDMS Export Validation**.  
The software displays the **PDMS Export Validation** dialog box.
2. Click the browse button  beside the **Filter** box, and then select the appropriate filter. By default, the software displays the active filter for the current session.
3. Select **Validate from mapping file**.

4. Specify the location of the mapping file to be validated. By default, the validation tool updates the mapping file located in *[Reference Data Folder]\SharedContent\Content\Translators\S3DPDMSExport*. To specify a mapping file in a different location, select **Specify alternative location** and then type the full path location and file name in the **Data/Mapping file to validate** box. Alternatively, click the browse button  beside the **Data/Mapping file to validate** box, and then navigate to the location.
5. In the **Validation criteria** list, select the object types for which mapping is to be validated. You must select at least one criterion from the list.
6. In the **Log file details** box, type the name and folder location of the log file. Alternatively, click the browse button , and then navigate to the location.
7. Click **Validate**.

*The software validates the mapping data that you have defined and creates a worksheet named **Smart 3D Objects-Missing Mapping** in the **S3DPDMSExportMapping.xls** workbook. This sheet lists the missing mapping information. The software also updates individual worksheets with missing mapping information. For easy identification, the software highlights any updated cell in red.*

8. Review the log file for any errors.

 **NOTE** If the mapping file is read-only, the software creates a copy of the file with the name **<Mapping file name>\_COPY.xls**, and saves it in the same location as the original mapping file. The software updates the copy of the mapping file with the missing mapping details.

## PDMS Export Validation Dialog Box

### Filter

Displays the active filter of the session file. Click **Browse**  to navigate to and select a different filter.

### Target (PDMS) object selection criteria

Specify the selection criteria. The current release of the software supports only the **Validate from mapping file** option.

### Specify alternative location

Allows you to specify a mapping file other than the one in the default location. By default, the software updates the mapping file located in *[Product Folder]\SharedContent\Content\Translators\S3DPDMSExport*. To specify a different location, select this option and then type the full path location and file name in the **Data/Mapping file path** box. Alternatively, click the browse button , and then navigate to the location.

### Data/Mapping file path

Type the full path location and name of the mapping file to validate. This option is available only if you select **Specify alternative location**. Updating DATA files is not supported in the current release of the software.

### Validation criteria

Select the Smart 3D objects whose mapping you want to validate. Objects are listed by discipline. For each criterion that you select, the software validates the corresponding

worksheet in the mapping file. You must select at least one object in the **Validation criteria** list.

Validation Criteria	Details
<b>Hierarchy</b>	Reports missing mapping for the Smart 3D objects hierarchy in the <b>CustomizeS3DHierarchyMap</b> sheet.
<b>Equipment Models</b>	
<b>NOTE</b> For more information about any of the equipment mapping sheets referenced in the following rows, see Equipment Translation Maps.	
<b>Nozzles</b>	Reports missing mapping for pipe nozzle <b>CATRef</b> attributes in the <b>CPStraightNozzleCAtRefMap</b> and <b>CPElbowNozzleCAtRefMap</b> sheets. Reports missing mapping for HVAC nozzle <b>CATRef</b> attributes in the <b>CPHvacNozzleCatRefMap</b> sheet.
<b>Catalog equipment</b>	Reports missing mapping for <b>PartNumber</b> and <b>TempPartNumber</b> attributes in the <b>PartNumberValueMap</b> and the <b>DesParamAdditonalAttrMap</b> sheets, respectively.
<b>Shapes</b>	Reports missing mapping for <b>ShapePartClass</b> in the <b>CPShapeValueMap</b> sheet.
<b>Piping Models</b>	
<b>NOTE</b> For more information about any of the piping mapping sheets referenced in the following rows, see Piping Translation Maps.	
<b>Components</b>	Reports missing mapping for the following: <ul style="list-style-type: none"> <li>▪ Smart 3D part identifiers for pipe parts in the <b>S3DPartIdentifierMap</b> sheet.</li> <li>▪ Smart 3D catalog components in the <b>CatalogComponentSPREFMap</b> sheet.</li> <li>▪ Smart 3D catalog components in the <b>NPDSpecificSPREFMap</b> sheet.</li> <li>▪ Smart 3D catalog specialty items in the <b>CatalogSpecialtySPREFMap</b> sheet.</li> <li>▪ Smart 3D catalog instrument items in the <b>CatalogInstrumentSPREFMap</b> sheet.</li> <li>▪ Smart 3D on-the-fly specialty items in the <b>OnFlySpecialitySPREFMap</b> sheet.</li> <li>▪ Smart 3D on-the-fly instrument items in the <b>OnFlyInstrumentSPREFMap</b> sheet.</li> </ul>
<b>Specification</b>	Reports missing mapping for pipe run specification in the <b>PipeRunSpecMap</b> sheet.

<b>End Connection</b>	Reports missing mapping for the end connection of pipe parts in the <b>PipingEndConnectionMap</b> sheet.
<b>Stock parts</b>	Reports missing mapping for stock parts <b>SpecRef</b> attributes in the <b>CatalogComponentSPREFMap</b> sheet.
<b>Connections</b>	Reports missing mapping for gaskets <b>SpecRef</b> attributes in the <b>CatalogComponentSPREFMap</b> sheet and in the <b>NPDSpecificSPREFMap</b> sheet.
<b>Supports</b>	Reports missing mapping for pipe support components in the <b>PipeSupportSPREFMap</b> sheet, if the .ini file option <b>ExportSupportsAs</b> is set to ATTACHMENT_MAPPING in the .ini file.
<b>Structure Models</b>	
<p><b>NOTE</b> For more information about any of the structure mapping sheets referenced in the following rows, see Structure Translation Maps.</p>	
<b>Fire proofing</b>	Reports missing insulation on member parts in the <b>InsulationAttrMap</b> sheet. The tool also reports the missing insulation <b>SpecRef</b> attributes in the <b>InsulationSpecAttrMap</b> sheet.
<b>Cross sections</b>	Reports missing mapping for cross-section of member parts in the <b>StrucClassAdditionalAttributes</b> sheet.
<b>Materials</b>	Reports missing mapping for materials for objects such as <member parts, handrails, ladders, stairs, slabs footings, equipment foundations, plate parts, and hole fittings in the <b>StructureMatSpecMap</b> sheet.
<b>MarineCrosssections</b>	Reports missing mapping for cross section of profile parts in the <b>MarineCSAdditionalAttributes</b> sheet. Only applicable when using the software in Marine mode.
<b>WallComposition</b>	Reports missing mapping for the composition of wall parts in the <b>PDMSWallAdditionalAttributes</b> sheet.
<b>WallCrossSection</b>	Reports missing mapping for the cross section of wall parts in the <b>WallCrossSectionMap</b> sheet.  <b>NOTE</b> <b>WallComposition</b> is validated before <b>WallCrossSection</b> . If there is missing mapping in the <b>PDMSWallAdditionalAttributes</b> sheet, manually add the missing mapping to the sheet, and then validate the <b>WallCrossSectionMap</b> sheet.
<b>HVAC Models</b>	
<p><b>NOTE</b> For more information about any of the HVAC mapping sheets referenced in the following rows, see HVAC Translation Maps.</p>	

<b>Components</b>	Reports missing mapping for the following: <ul style="list-style-type: none"><li>▪ Smart 3D part identifiers for HVAC parts in the <b>HVACPartIdentifierMap</b> sheet.</li><li>▪ Smart 3D catalog components in the <b>HVACComponentSPREFMap</b> sheet.</li></ul>
<b>Specification</b>	Reports missing mapping for duct run specifications in the <b>DuctRunSpecMap</b> sheet.
<b>EndConnection</b>	Reports missing mapping for the end connection of duct parts in the <b>HVACEndConnectionMap</b> sheet.
<b>DuctParts</b>	Reports missing mapping for duct parts <b>SpecRef</b> attributes in the <b>HVACComponentSPREFMap</b> sheet.
<b>Connections</b>	Reports missing mapping for gaskets <b>SpecRef</b> attributes in the <b>HVACComponentSPREFMap</b> sheet.
<b>Supports</b>	Reports missing mapping for duct/design supports in the <b>HVACComponentsSPREFMap</b> sheet.
<b><i>Hangers and Supports Models</i></b>	
<b>NOTE</b> For more information about any of the piping mapping sheets referenced in the following rows, see Supports Translation Maps.	
<b>Supports</b>	<ul style="list-style-type: none"><li>▪ Reports missing <b>PartNumber</b> mapping for support components in the <b>SupportPartNumber</b> sheet.</li><li>▪ Reports the missing mapping for a support component's <b>GType</b> attribute in the <b>SupportGTYPE</b> sheet.</li><li>▪ Reports the missing mapping for a support component's <b>Attributes</b> in the <b>SupportUserAttributes</b> sheet.</li></ul>
<b><i>Electrical Models</i></b>	
<b>NOTE</b> For more information about any of the electrical mapping sheets referenced in the following rows, see Electrical Translation Maps.	
<b>Components</b>	Reports missing mapping for conduit and cable tray parts in the <b>ElectricalPartIdentifierMap</b> and <b>ElectricalComponentSPREFMap</b> sheets.
<b>Specifications</b>	Reports missing mapping for electrical specifications in the <b>ElectricalRunSpecMap</b> sheet.
<b>ElectricalStockParts</b>	Reports missing mapping for conduit and cable tray stock parts in the <b>ElectricalPartIdentifierMap</b> and <b>ElectricalComponentSPREFMap</b> sheets.

<b>EndPreparation</b>	Reports missing mapping for electrical end preparations in the <b>ElectricalEndConnectionMap</b> sheet.
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**Log file details**

Specify the full path location and file name of the log file to be created. Alternatively, you can click **Browse**  and navigate to the necessary location and file.

**Validate**

Runs the **PDMS Export Validation** command based on the criteria that you have specified.

**Cancel**

Closes the dialog box without performing the validation process.

## PDS Export

The **File > Export > PDS Export** command exports model data from Smart 3D into PDS. The process involves transferring Smart 3D objects and their attribute values to PDS file format. For information about the types of Smart 3D model data that you can export to PDS, see Export to PDS Workflow.

Please refer to the *Export to PDS Guide* or help file for detailed information about exporting Smart 3D data to PDS.

**★IMPORTANT** Prior to using the export to PDS functionality, you must perform the following tasks:

1. Edit the options in the delivered initialization file to define the parameters used in the export process. For more information about the initialization file, see Configure the PDS Export Initialization File.
2. Edit the mapping workbooks to reflect the customizations that you have made to the Smart 3D model object attributes. For more information about the mapping worksheets, see Appendix: Export to PDS Workbook.
3. Ensure that the mapping and **PDSExportTranslator.ini** files are in the same file path before exporting model data to PDS.

### *Export to PDS Dialog Box (on page 124)*

### *Export Options (on page 125)*

## **Export Smart 3D Models**

1. Click **File > Export > PDS Export > Export Model**.  
*The Export to PDS dialog box displays.*
2. Click the **Export** tab, and select the discipline from the **Discipline** list.
3. Type the location of the mapping file in the **Mapping File** box, or browse to the location.
4. Type the location of the log file in the **Log File** box, or browse to the location.
5. Click **Export**.
6. Review the log files for errors and warnings.

7. Repeat this procedure for each discipline that you need to export.

**★IMPORTANT** You must have MicroStation J installed on the same computer as Smart 3D when you export the model data for equipment, HVAC, and structural equipment. The export of structural data to CIS/2 and piping data to APL does not require MicroStation J.

## Export to PDS Dialog Box

Controls parameters for exporting Smart 3D model data to PDS.

- *Extract Tab (Export To PDS Dialog Box)* (on page 124)
- *Edit Tab (Export to PDS Dialog Box)*
- *Generate Tab (Export to PDS Dialog Box)*
- *Export Tab (Export To PDS Dialog Box)* (on page 125)

### Extract Tab (Export To PDS Dialog Box)

Exports or updates a hierarchy for Smart 3D systems to the hierarchy mapping file.

For example, if you want to export Equipment, **Extract** finds the object ID for each system that contains equipment objects, finds those equipment objects, and exports or updates that hierarchy to the mapping file.

- The **EquipmentHierarchy** sheet in the mapping file is updated with the hierarchy of the Smart 3D systems for the equipment discipline.
- In the same way, worksheets for each discipline are updated at the time of hierarchy export. The **PipingHierarchy**, **ElectricalHierarchy**, **StructureHierarchy**, **StructuralEquipmentHierarchy**, and **HVACHierarchy** sheets are updated for their respective disciplines.
- For piping, the pipeline systems, the OID and number of pipe runs under that system are exported to the hierarchy mapping file.

#### Discipline

Specifies the discipline (such as piping or equipment) for which to export the hierarchy. You can select a discipline from the list.

#### Export Options

Opens the **Export Options** dialog box. For more information, see *Export Options* (on page 125).

#### Mapping File

Specifies the mapping file to use in the export process. The mapping file is a Microsoft Excel workbook that is used to extract or update Smart 3D hierarchy information. Templates of hierarchy mapping sheets are delivered with the mapping file. The mapping file is delivered to the *[Reference Data Folder]\SharedContent\Content\Translators\S3DPDSExport* folder. You can copy the mapping sheets to another workbook to create your own hierarchy mapping file.

#### Log file

Specifies the location and file name for logging process information. Click **View Log** to view the log file.

**Extract**

Extracts or updates the hierarchy as specified.

**View Log**

Displays the log file. This is only available after you click **Extract**.

***Export Tab (Export To PDS Dialog Box)***

Exports model data to PDS.

**Discipline**

Specifies the discipline (such as piping or equipment) for which to export the hierarchy. You can select a discipline from the list.

 **Export Options**

Opens the **Export Options** dialog box. For more information, see *Export Options* (on page 125).

**Mapping File**

Specifies the mapping file to use in the export process. The mapping file is a Microsoft Excel workbook that is used to extract or update Smart 3D hierarchy information. Templates of hierarchy mapping sheets are delivered with the mapping file. The mapping file is delivered to the *[Reference Data Folder]\SharedContent\Data\Translators\S3DPDSExport* folder. You can copy the mapping sheets to another workbook to create your own hierarchy mapping file.

**Log file**

Specifies the location and file name for logging process information. Click **View Log** to view the log file.

**Use Cross Section Mapping File**

Exports structural members to the mapping file used to import structural objects in PDS. This mapping file is the same file used to import structural objects through CIS/2 in PDS. This option is available only if you set **Discipline** to **Structure** and if auto transfer is enabled.

**Export**

Exports the model as specified.

**View Log**

Displays the log file. This is only available after you click **Export**.

***Export Options***

The **File > Export > PDS Export > Export Options** command edits the *[Product Folder]\Smart3D\3DRefData\SharedContent\Data\Translators\S3DPDSExport\PDSElexportTranslator.ini* file. You can also edit the PDSElexportTranslator.ini file directly with any ASCII file editor.

## Global

The Global settings are used to define the MicroStation symbology for each Smart 3D display aspect.

### Auto Transfer

Automatically generates areas and models on export, and loads the piping and structure files to their corresponding .dgn files. This option is cleared by default. You must have at least two **S3P** keys to successfully export a piping model using this option.

### PDS Project Name

Select the PDS project name to which to transfer Smart 3D data. This option is available only if you select **Auto Transfer**.

### Aspect

Select the Smart 3D aspect for which to define MicroStation symbology.

### Level

Type the MicroStation level for the selected aspect. Valid levels are 1 to 63.

### Color

Select a color for the selected aspect.

### Weight

Type the MicroStation line weight for the selected aspect. Valid weights are 0 to 31.

### Style

Select the MicroStation line style for the selected aspect.

## Equipment

### Number of Equipment per Model

Type the maximum number of equipment to put into a single MicroStation design file (.DGN).

## Piping

### Number of Pipelines per Model

Type the maximum number of pipelines to put into a single Alphanumeric Piping Language (APL) file.

## Structure

### Number of Structures per Model

Type the maximum number of structural objects (beams, columns, braces, and slabs) to put into a single CIS/2 file.

### Number of Structural Equipment per Model

Type the maximum number of walls, ladders, and stairs to put into a single equipment MicroStation design file (.DGN).

**Object Type**

Select the Smart 3D aspect for which to define MicroStation symbology.

**Level**

Type the MicroStation level for the selected aspect. Valid levels are 1 to 63.

**Color**

Select a color for the selected aspect.

**Weight**

Type the MicroStation line weight for the selected aspect. Valid weights are 0 to 15.

**Style**

Select the MicroStation line style for the selected aspect.

**HVAC****Number of HVAC Ducts per Model**

Type the maximum number of ducts per MicroStation design file (.DGN).

**Object Type**

Select the Smart 3D aspect for which to define MicroStation symbology.

**Level**

Type the MicroStation level for the selected aspect. Valid levels are 1 to 63.

**Color**

Select a color for the selected aspect.

**Weight**

Type the MicroStation line weight for the selected aspect. Valid weights are 0 to 15.

**Style**

Select the MicroStation line style for the selected aspect.

**NOTE** When you export HVAC objects, the symbology defined for the **Simple\_Physical** aspect is overwritten by the symbology defined for the following HVAC objects:

- Duct parts - **DUCT\_SYMBOLOLOGY**
- Duct components - **DUCT\_COMPONENT\_SYMBOLOLOGY**

**Electrical****Number of Cableways and Conduits per Model**

Type the maximum number of cableways and conduit runs to put into a single MicroStation design file (.DGN).

**Object Type**

Select the Smart 3D aspect for which to define MicroStation symbology.

**Level**

Type the MicroStation level for the selected aspect. Valid levels are 1 to 63.

**Color**

Select a color for the selected aspect.

**Weight**

Type the MicroStation line weight for the selected aspect. Valid weights are 0 to 31.

**Style**

Select the MicroStation line style for the selected aspect.

**NOTE** When you export electrical objects, the symbology defined for the **Simple\_Physical** aspect is overwritten by the symbology defined for the following electrical objects:

- Cable tray parts - **CABLE\_TRAY\_SYMBOLOLOGY**
- Cable tray and conduit components - **ELECTRICAL\_COMPONENT\_SYMBOLOLOGY**
- Conduit parts - **CONDUIT\_SYMBOLOLOGY**
- Cableway features and duct banks - **CABLEWAY\_SYMBOLOLOGY**

## **Points to Consider**

**General**

- To use the auto transfer, Intergraph recommends that you install PDS version 12.00.01.16 or higher. You must also install the **Smart3d PDS Data Access** component.

**Reference Data and Catalog Data**

- The catalog data must be the same for both Smart 3D and PDS for the export to yield correct results. For more information, see Define Matching Reference Data.

**Piping**

- Stock parts in Smart 3D which do not meet the minimum pipe length criteria in PDS, result in a piping placement error after importing.
- You must resolve all Smart 3D To Do List items before exporting. Unresolved To Do List items can cause unexpected results in PDS. For example, pipe bends modeled incorrectly in Smart 3D might result in irrelevant graphics when imported.
- The number of pipelines created in PDS by the export process might be higher than the number of pipe runs exported from Smart 3D.
- The pipe part symbols and their default orientation should be same in Smart 3D and PDS.
- When you export spectacle blinds to PDS without setting the base part of the spectacle blind feature to either **spectacle blind is in open position** or **spectacle blind is in closed position**, the software creates an open blind in PDS by default.
- Flex pipes from Smart 3D are exported to PDS as specialty items. To map the Smart 3D identifier value of this pipe part with PDS Model Code in the **SpecialtyModelCodeMap** worksheet, the S3D Identifier value should be defined by the S3D short code value followed by "\_FlexPipe".

- You must define the Commodity class to successfully export the piping components to PDS. Commodity class can be defined in the property page of an object in Smart 3D.

### Dimensional Data Mapping

- For a Smart 3D piping specialty or instrument, you must define or create a corresponding specialty symbol in PDS. The symbol must be designed so that any dimensional data (DIM1, DIM2, and so on through DIMn) required to place the piping specialty or instrument in PDS can be mapped to the attribute data on the Smart 3D specialty object.
- You must map the Smart 3D specialty tag or part number of the piping specialty or instrument in the mapping file to corresponding PDS commodity name in the **SpecialtyModelCodeMap** and **InstrumentModelCodeMap** worksheets.
- Map the tutorial form name for the piping specialty or instrument to the **TUT** attribute in the **DimensionalDataMapMapForSpecialty** and **DimensionalDataMapForInstrument** worksheets. Map the rest of the dimensions to appropriate Interface.Attribute values. You must refer to the symbol definitions in both Smart 3D and PDS to decide which dimension to map to which Interface.Attribute.
- The following figure is an example of dimensional-data mapping for the piping specialty STRB1 (Basket Strainer) which is mapped to the **CSBasketStrainer4** specialty in Smart 3D.

PDS Value	Attribute Name	Attribute Value
STRB1		
	TUT	PSA018
	DIM1	[IJUASpecialtyStrainer.CollarThickness]
	DIM2	[IJUASpecialtyStrainer.BasketLength]
	DIM3	[IJUASpecialtyStrainer.BasketEndDiameter]
	DIM4	[IJUASpecialtyStrainer.CollarEndToCenter]

The tutorial form that accepts the dimensional data input for STRB1 is PSA018.fb.

DIM1=Dimension **A**, which is equal to the CollarThickness attribute available on the IJUASpecialtyStrainer interface of the CBasketStrainer specialty in Smart 3D.

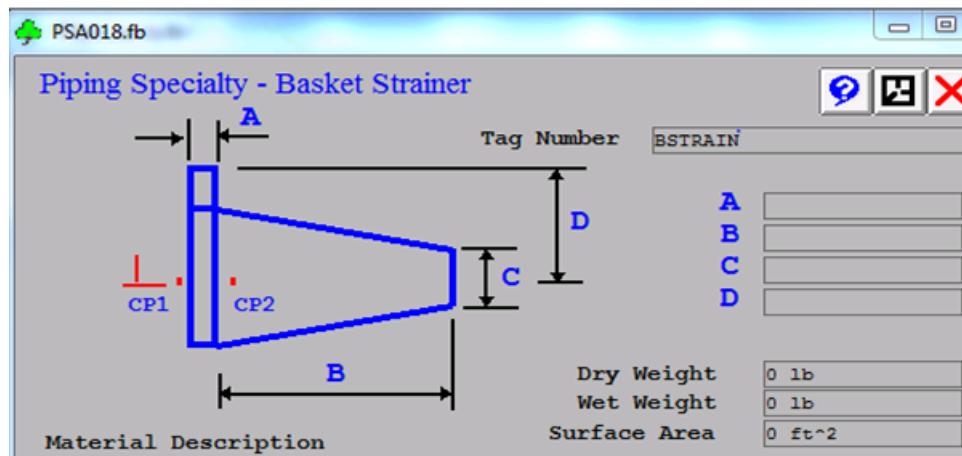
Similarly,

DIM2=Dimension **B** = BasketLength attribute on the IJUASpecialtyStrainer interface,

DIM3=Dimension **C** = BasketEndDiameter attribute on the same interface,

DIM4=Dimension **D** = CollarEndToCenter attribute on the same interface.

**NOTE** Interface.Attribute must be surrounded by square braces as shown above.



## Taps

- Load the taps' data into the PDS project to ensure that the taps are imported through the APL file correctly.

## ***Limitations when Exporting from Smart 3D to PDS***

The following limitations exist when exporting Smart 3D equipment, equipment nozzles, piping, structure model, and electrical data and then importing that data into PDS.

### General

- Smart 3D object names with some special characters such as € or § might not transfer with exactly the same name because the export functionality uses some of these characters for the syntax of the functionality. The possibility exists that such names will not match on both sides of the export.
- The design file limit in PDS is 26.8 kilometers. Smart 3D objects that you have placed further than 26.8 km from the global coordinate system origin export successfully to the design file. However, the design file will not open in PDS. Before starting the export process, make sure that the modeled objects are within the PDS design file limits.

### Equipment

PDS has a 30-character limit for equipment names, so the equipment name in Smart 3D cannot be longer than 30 characters. If the name of the equipment component is more than 30 characters, it is truncated during the export from Smart 3D.

**NOTE** PDS does not support duplicate names for equipment items. You must assign a unique name for each equipment in Smart 3D. Duplicate names in Smart 3D, or duplicate names after truncation, can cause the export process to give incorrect results.

### Equipment Nozzle

- PDS has a 10-character limit for nozzle names, so the nozzle component name in Smart 3D cannot be longer than 10 characters.

- PDS allows duplicate names for nozzle components, as long as the nozzle components are assigned to different equipment items in the same .dgn file. Otherwise, the export process might display incorrect results.
- Equipment piping nozzles are exported with connect point data. HVAC nozzles, and electrical nozzles such as cable nozzles, cable tray nozzles, and conduit nozzles are not exported.

## Piping

- PDS has a 20-character limit for piping component/support names, so the piping component/support name in Smart 3D cannot be longer than 20 characters. If the name of the piping component/support is more than 20 characters in Smart 3D, it is truncated during export. Similarly, piping specialty and instruments are limited to 30 characters and will also be truncated if needed. PDS allows for duplicate names for piping, support components, and instruments and specialties.
- If an equipment or nozzle name is not defined in Smart 3D, the connection between any pipe run and that pipe nozzle is lost when the model is exported to PDS. In this situation, the pipe run starts from the connect point (the East, North, and Elevation coordinates) of the nozzle port without having any connection.
- PDS does not support modeling of circular piping. Because of this, circular stock parts are skipped. The software writes an entry in the log file for each circular stock part.
- Do not export pipelines with both imperial and metric specifications to the same APL file.
- Supports that are placed at a location other than the elbow connect points are exported as connected to the elbow's center.
- Only the specification driven attributes for pipes are transferred to sloped pipe runs.
- To construct pipes on the sloped pipe segments, import the APL file and then enable the **Automated Placement** in PDS.
- In Common application, insulation thickness is valid only when you define the insulation purpose. Define the insulation purpose in Smart 3D before you export the insulation data using Common application.
- You can define insulation at run level and at the component level in Smart 3D. By default, the same insulation data is applicable to components. The export process exports only the insulation data at run level. The component level insulation is ignored. However, in case of Instruments and Specialties, the component level insulation is considered.
- The **Commodity Names** sheet in the mapping file maps the Smart 3D short code **S3D Value** and PDS commodity names short code **PDS Value**. To export turn features such as Elbow, Bend, Miter, and so on, append <\_PIPE TURN TYPE> to the **S3D Value**.

For example, to export an **Elbow** with a short code **45 Degree Direction Change**, the **S3D Value** is **45 Degree Direction Change\_ELBOw**.

- The Export to PDS software exports all the S3D piping supports to PDS as logical supports.
- PDS does not support feature breaks on the pipe stock parts. Feature breaks are skipped and the following message is added to the log file for each feature break:  
*Feature breakdown is not supported in PDS, hence exporting it as stock part.*
- The software exports flex pipes from Smart 3D as specialty items.
- The flow direction, **NOFLOW**, of a pipe run or pipeline is exported as **UNDEFINED**.

- The Smart 3D sequence number attribute on pipe runs is not automatically exported to PDS. You can use label mapping to export sequence numbers on pipe runs. PDS has a 16-character limit for pipe run and pipeline sequence numbers, so the mapped label value of the pipe run or pipeline sequence number in Smart 3D cannot be longer than 16 characters. A mapped value longer than 16 characters in Smart 3D is truncated during export.

### Structure

- FrameWorks Plus has a 24-character limit for all structure components, including beams, slabs, columns, vertical and horizontal braces, walls, and arc members. If the name of the structure component in Smart 3D is more than 24 characters, it is truncated during export. FrameWorks Plus allows for duplicate names for structural components.
- Slabs and solids are limited to 95 vertices (placement defining points).
- Openings are not supported on linear or arc members.
- FrameWorks Plus supports only circular arc members. Arc members that are created by elliptical arcs are not supported.
- FrameWorks Plus supports only slabs or slab openings that are created by circular, elliptical, and linear elements.
- Smart 3D does not export assembly connections to the CIS/2 file. Therefore, connection details and assembly connections are not imported into FrameWorks Plus.

### Electrical

Cable object does not have any persistent graphics in Smart 3D. Hence these objects are not exported to PDS.

## Print

Sends a copy of the active window to a specified plotter or printer. What you see in the active window is what appears on the printed document.

The software uses the standard Microsoft Windows **Print** dialog box. To access additional printer properties, click **Properties**. The settings that are available in the dialog box depend on the type of printer that is currently selected in the **Print** dialog box.

### NOTES

- The software automatically produces the view snapshot on a white background, regardless of the settings currently defined for the default background color.
- The shortcut key for the **Print** command is CTRL+P.
- You must install and select a printer or plotter before you use this command. For help on installing a printer or plotter, see *Windows Help*.

## Print the active window

1. Select the window you want to print.
2. Click **File > Print**, or press CTRL+P.
3. In the **Name** box, select the printer to use.

4. In the **Number of copies** box, type the number of copies that you want.

#### **NOTES**

- You can set additional options for the printer by clicking **Properties**.
- Save your current session before you print. If a printer error or other problem occurs, you will not lose any work completed since the last time you saved the session.
- What you see in the active window is what appears on the printed document. Be sure to make any necessary changes to the view before printing, such as adjusting the orientation of the view or the zoom.
- The software automatically produces the view snapshot on a white background, regardless of the settings currently defined for the default background color.

## Print Dialog Box

Sets options for printing the contents of the active window.

### Name

Specifies the printer that you want to use. You can select from a list of all the configured printers available for printing.

### Properties

Opens the **Printer Document Properties** dialog box in which you can set properties for the printer that you selected in the **Name** list. The settings available on this dialog box depend on the type of printer that you have selected.

### Status

Displays the current status of the selected printer. This area is read-only.

### Type

Displays the type of printer currently selected. This area is read-only.

### Where

Displays the printer path or location for the currently selected printer. This area is read-only.

### Comment

Displays any comments you input during printer configuration. This area is read-only.

### Print to file

Prints the document to a file instead of a printer. Specify the name of the file on the **Print to file** dialog box after you select this check box, and click **OK** on the **Print** dialog box. Using this option saves a document to a file instead of routing it directly to a printer or plotter. You can then print from a computer that does not have the application installed, or print to a printer other than the one you have currently installed.

### Print Range

Displays options for selecting the print range. The **Pages** and **Selection** options are not supported by the software. The default option is **All**.

### Number of copies

Specifies the number of copies you want to print.

**Collate**

Organizes sheets when you print multiple copies. This option is available only when **Number of copies** exceeds 1.

## Most Recently Used List

Opens a recently used session file. The last session you opened is at the top of the list. You can have up to four sessions in the list.

## Exit

Closes the open session and exits the software. If you have changed data since the session was last saved, or if you have not saved a new session, the software prompts you to save your changes.

## SECTION 5

# Edit Menu

The **Edit** menu provides commands for undoing incorrect actions, copying and pasting, modifying objects, and opening hyperlinks. Some of the commands on this menu might change depending on the active task.

### In This Section

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## Undo

➤ Reverses all changes of your transactions on information in the model database. This command does not affect data stored in your session file. For example, it does not undo view manipulation commands such as fit, zoom, or pan.

You can undo Reference 3D object **Exclude** and **Include** command operations. For more information, see *Exclude and Include Reference 3D Objects* (on page 383).

Actions you can undo fall into three categories:

- **Modification** - You do not want to keep the modifications you made.
- **Entity Creation** - You want to remove something you created. You can remove the object with **Delete**  or undo.
- **Entity Deletion** - You want to restore objects that you deleted.

The software creates a private undo list for you when you open a session. When you close the session, the software deletes the undo list. Selecting **Save** or **Save As** has no effect on your **Undo** list.

To prevent the **Undo** data from continually increasing, you have the option to limit the number of transactions the software must remember by going to **Tools > Options > General**. You can disable the **Undo** command by clearing the **Make Undo available** option. For more information, see *General Tab (Options Dialog Box)* (on page 509).

You can use **Undo** by selecting **Edit > Undo**, by clicking **Undo**  on the toolbar, or by using the shortcut keys **CTRL+Z**.

### **WARNINGS**

- You cannot undo the **Claim** command. In addition, the **Undo** history is cleared after you run **Claim**, meaning actions taken prior to claiming cannot be undone.
- Most dialog box actions cannot be undone. For example, if you delete a named view using **Views > Named Views**, you cannot use **Undo** to recreate the named view.

---

### **What do you want to do?**

- *Cancel your last action* (on page 136)
- *Turn undo on or off* (on page 136)

---

## **Cancel your last action**

On the **General** tab, click **Undo** .

### **NOTES**

- You can use **Undo** by selecting **Edit > Undo**, by clicking **Undo**  on the toolbar, or by using the shortcut keys **CTRL+Z**.
- On the **General** tab of the **Tools > Options** dialog box, you can enable or disable **Undo**. You can also specify how many previous actions can be canceled. For more information, see *Options Dialog Box* (on page 509).

## **Turn undo on or off**

1. Click **Tools > Options**.
2. On the **General** tab, select the **Make Undo available** check box to activate or deactivate the feature. A check mark indicates that the **Undo** command is available.

### **NOTES**

- When you enable the **Make Undo available** feature, you can specify the number of previous actions that can be cancelled in the **Number of undo actions** list.
- You can use **Undo** by selecting **Edit > Undo**, by clicking **Undo**  on the toolbar, or by using the shortcut keys **CTRL+Z**.

## Copy

 Copies selected objects and their associated relationships to the Clipboard. The Clipboard retains the format of the copied objects and converts them to other formats as required when you paste them using *Paste* (on page 138).

When you copy more than one object at a time, the software copies all relationships shared among the objects. If there is a relationship between a selected object and an object that you did not select, then the copied set of objects is expanded automatically to include the excluded object. The **Copy** command also copies the current permission groups of the copied objects.

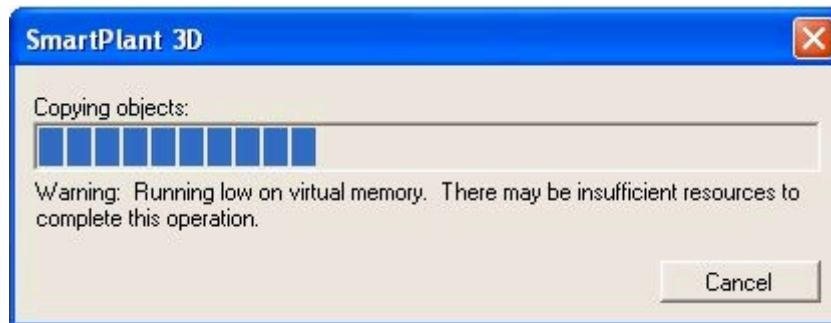
You can copy an object from one workspace and paste it into another. The workflow for the **Copy** command is the same. However, you use *Paste and Restore* (on page 145) to paste into the other workspace.

### Copying Route Objects

HVAC, Electrical, and Piping route objects require a parent object. Smart 3D creates a copy of the parent run when you copy an associated route feature. For example, if you copy a pipe feature, the software creates a copy of the parent pipe run along with all of the attributes. If you select pipe features that belong to multiple parents, the software creates a copy for each parent run.

### NOTES

- The shortcut key for the **Copy** command is CTRL+C.
- When copying graphical objects, you click a reference point (From point) on an object in the select set.
- You can view the selected objects count on the status bar just to the left of the To Do List indicator.
- When copying a large data set, a progress bar is displayed. If the software determines that the **Copy** operation might run out of virtual memory, the following message appears below the progress bar:



If you cancel the operation, an entry is added to the error log.

## Copying Large Areas of the Model

Copying large areas of the model can save you a great deal of time and design effort. More information is provided in the Model Data Reuse (MDR) topic of the *Project Management User's Guide*. However, to make the most effective use of your original design, keep the following in mind:

- Use filters to select precisely the objects that you want to copy. Copy as much as possible in a single operation so that you can take advantage of the existing relationships in your model.
- When you create the filters, create an asking filter for the system. Also, create an asking filter for the system and objects. Then, create a compound asking filter that combines the two.
- Duplicate the system hierarchy for the paste operation. This hierarchy provides a destination location for the copied objects and allows you to easily identify and delete any duplicates.
- For complex areas, it may be useful to copy and paste the structure first. Very large structural areas may need to be broken down into smaller structural areas.
- When the software pastes the copied objects, it tries to maintain the original relationships. Be careful to include all of the related objects in the copy set. For the same reason, include all lines, reference planes, and so on that have relationships to the objects that you are copying. If you have created objects with relationships to items that no longer exist in the model, such as slabs related to reference planes that have been deleted, you may need to leave those objects out of the copy set and recreate them in the new area of the model.
- It may be helpful to create breaks in the model to create logical areas to copy. Because the software tries to maintain relationships, and those related objects may not be present in the paste location, you may need to isolate the area that you want to copy from the connected objects that are not in the copy set.
- Use naming rules whenever possible. Objects that are named with naming rules automatically update when copied and pasted. Objects with user-defined names receive a **Copy of** prefix.

## Paste

 Inserts the Clipboard contents in a selected document or a selected area of the model.

The contents of the Clipboard can be pasted into another document in several supported formats. The supported formats are:

- Native to the three-dimensional software
- Picture/Enhanced Metafile (GDI)
- Text/OEM
- Text/RTF/Unicode (only the selected text)

The **Paste** command inserts an object as a new object. The name rule for the object also updates, so the object has a new name. You can specify whether you want the software to place the new object directly on top of the copied object, or if you want to define the new position for the pasted objects.

You might need to copy an object from one workspace and paste it into another. Use *Paste and Restore* (on page 145) to insert an object with the same identity and name.

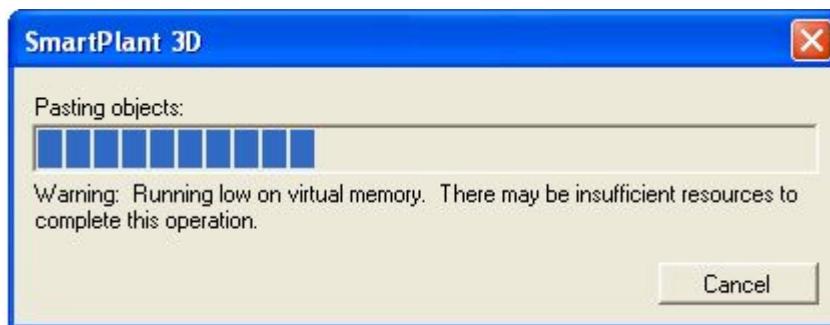
## Pasting Routing Path Objects

When you paste HVAC, Electrical, or Piping route objects in the model, Smart 3D creates the copy of the object under the same parent by default. You can specify a different location if necessary. When you paste the route objects, the software does the following:

- Names the new run as *Copy of <Name of Source Run>*.
- Replicates all of the attributes defined on the source run to the destination run.

### NOTES

- The shortcut key for the **Paste** command is CTRL+V.
- When pasting a large data set, a progress bar is displayed. If the software determines that the **Paste** operation might run out of virtual memory, the following message appears below the progress bar:



If you cancel the operation, an entry is added to the error log.

- Previous releases of the software required you to manage the GUID tabs on bulkload workbooks in order to copy data across models that used different catalogs. This ensured that identical definitions had the same GUIDs. In this release, the **Paste** command automatically manages the GUIDs. You can now copy data across models without manually ensuring that the GUIDs in the source and destination catalogs match.

## Model Data Reuse and Model Data Transform Workflow using Delete Optional

Smart 3D can delete optional inputs of the marine objects (plates, profiles, and so forth) including detailing objects during copy paste, Model Data Reuse (MDR), and Model Data Transform (MDT) processes so that objects can be copied and moved without having to select all the inputs at the new location.

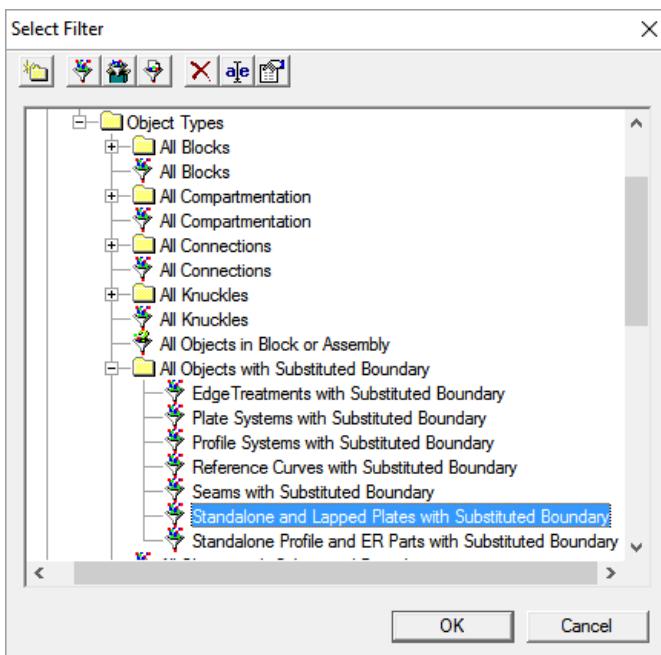
For example, plate system boundaries are inputs that should be redefined at the new plate location. However, by selecting **Delete Optional**, you can replace all the optional inputs (including boundaries, coordinate system, and so forth) with dummy objects (Dummy Plane, Dummy Surface, and so forth). After the copy is complete, you can then go back and replace the plate's dummy objects with real objects. However, in a large model, it is sometimes difficult to identify the plates that have dummy optional inputs.

### How to Identify Objects with Dummy Inputs

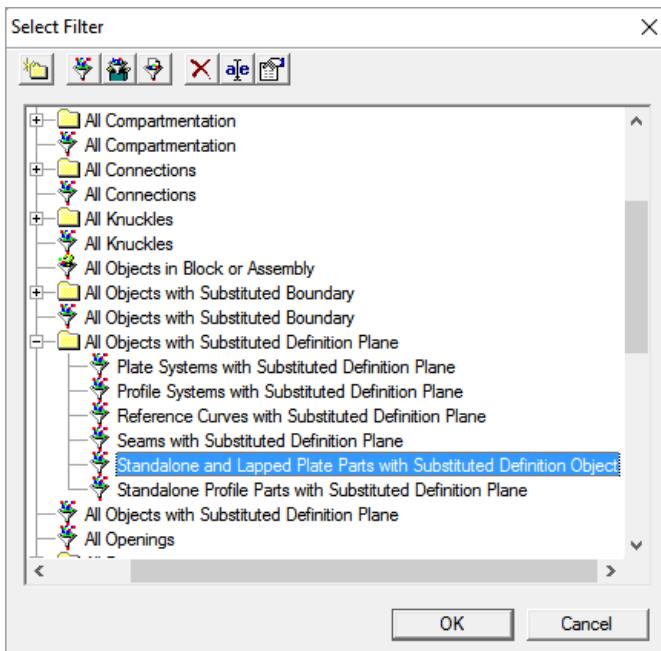
Smart 3D provides filters to identify objects with dummy inputs. You can access the **Select Filter** dialog box using:

- **File > Define Workspace > Properties**
- **Tools > Select by Filter**

For example, to find all the standalone and the lapped plate parts whose boundaries are replaced by dummy objects, define the workspace using the **Standalone and Lapped Plates with Substituted Boundary** catalog filter.

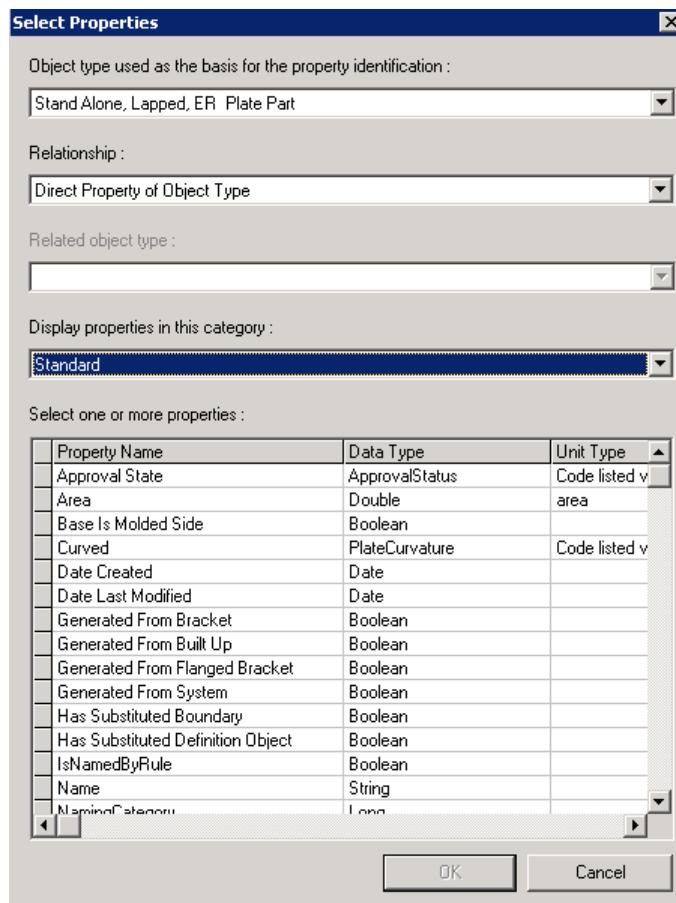


Similarly, if these plates whose definition objects are replaced by dummy objects, define the workspace with the filter **Standalone and Lapped Plates with Definition Object**.

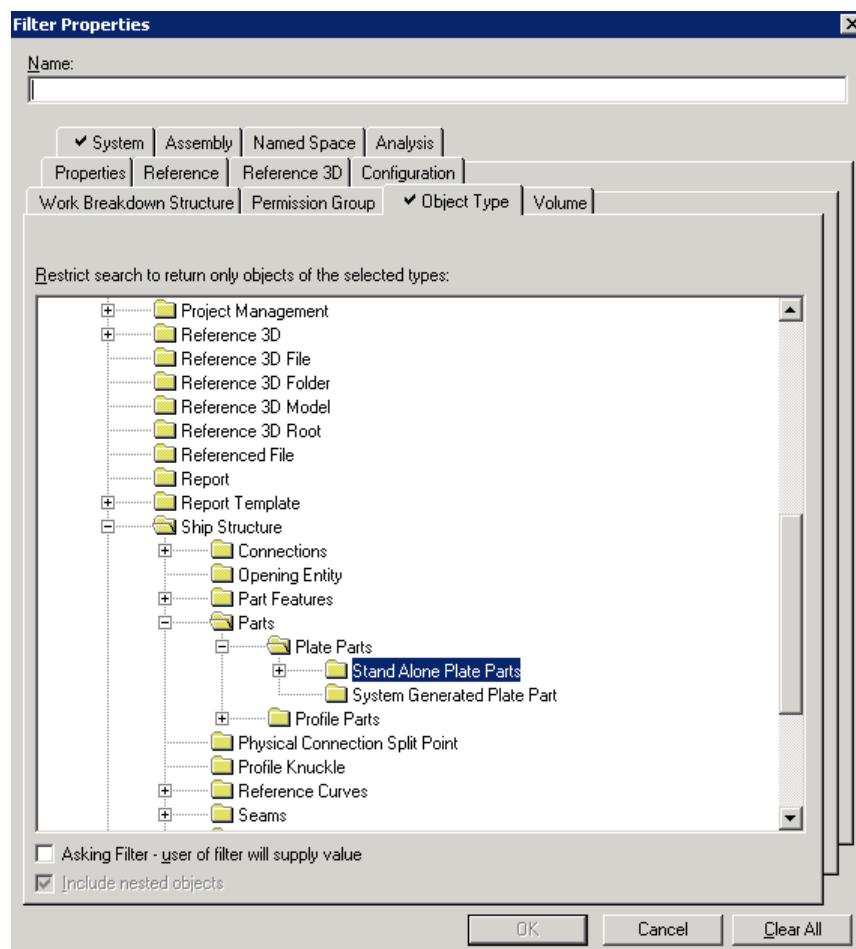


You can define your own filters to find specific detailing objects in the workspace that have dummy boundaries or definition-objects by defining the property **Has Substituted Boundary** or **Has Substituted definition object**. To create a new filter:

1. Click **File > Define Workspace**.
2. In the **Model** list, select the model.
3. In the **Filters** list, click **Create New Filter**.
4. On the **Properties** tab, select the object properties to restrict your search.
5. Click **More...** and select the object type used and the property name **Has Substituted Boundary**, and click **OK**.



- On the **Object Type** tab, select the object type to highlight. If you do not select any objects, the filter includes all objects in the list. To include one or more object types in your filter, press CTRL and click the name of each object type that you want to include. Click **OK**.



## Copy and paste an object

- Select one or more objects.

**TIP** You can view a count of the selected objects on the status bar just to the left of the **To Do List** indicator. This count gives you an idea of how long the copy/paste operation might take.

- Right-click to select **Copy** or click **Copy**  on the toolbar.

**TIP** Press Ctrl+C or click **Edit > Copy**.

- Click a reference point (From point) on an object in the select set.

**TIPS**

- You can select any reference point to use to later position the pasted objects. For example, you can click a coordinate system, control point on a piece of equipment or use PinPoint to specify the coordinates.

- Some logical objects such as Systems and Pipelines, do not prompt you for a reference point. In these cases, the **Paste** command only allows **Paste in place**.

4. Right-click to select **Paste** or click **Paste**  on the toolbar.

**TIP** Press Ctrl+V or click **Edit > Paste**.

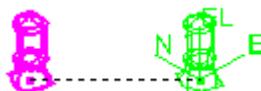
5. On the **Paste** dialog box, assign target relationships, review the options, and adjust as needed.

**TIP** You can select options to keep the original permission groups and to paste the objects in place. For example, you might want to keep the original permission groups when pasting large data sets containing different types of objects (piping, equipment, and structure).

6. Click **OK**, and click in the model to place the objects.

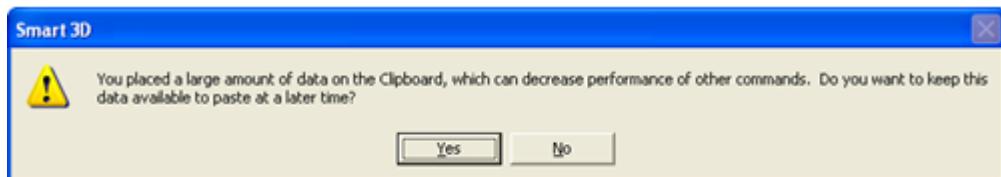
#### **TIPS**

- For small select sets (less than 100 objects), the software displays the objects in green dynamics.



- For large select sets or sets containing structural members, the software displays a three-dimensional range box in red outline.

**WARNING** After you copy a large data set, the data remains in memory until you copy another set of objects, copy data in another application, or exit Smart 3D. If you copy a large data set and then continue working in Smart 3D, your computer's performance may be impacted due to memory usage. Smart 3D displays the following warning message after you paste a large data set:



Click **Yes** to keep clipboard data available, and click **No** to clear your clipboard.

## Paste Dialog Box

The **Paste** command allows you to paste the objects as new objects with new names. In the **Paste** dialog box, you can specify additional information for pasting objects or information into the current model.

### Description

Provides a description of the input object.

### Selection

Shows the parent of object (named objects in WSE) or geometry constraining object (Assoc Point) associated with the object (sometimes unnamed (Optional) relationships) highlighted in yellow graphic view.

### Delete Optional

Deletes all optional relationships in the **Paste** dialog box. This option is useful when you want to delete all optional relationships in bulk mode.

**★ IMPORTANT** If you use **Delete Optional**, the objects that you copy might create **To Do Record**. You must go to the **To Do List** to review these objects and redefine any needed relationships. Objects that are likely to have record created in **To Do List** when you use **Delete Optional** include, but not limited to: stairs, ladders, slabs, and walls.

**💡 TIP** To delete the individually selected optional relationships, select the required optional relationship, and then click **Delete Optional** or press the SPACEBAR or DELETE key.

### Show Clipboard window

Opens a window that displays the Clipboard (copied physical objects), including the input objects.

### Keep original permission groups

Controls the permission group assignment for the pasted objects. This option is helpful when you are pasting large data sets containing different types of objects (piping, equipment, structure). Here are some important points to remember about this option.

- When this option is selected, the software assigns all pasted objects to the original permission group, as long as you have write access to that permission group. If you do not have write access or if the permission group does not exist, then the software assigns the objects to the active permission group.
- When this option is not selected, the software assigns the objects to the active permission group.
- When pasting objects from one database to another, permission groups are considered identical if they have the same name.

### Paste in place

Controls whether **Paste** inserts the Clipboard contents at the same coordinates as copied objects, or whether **Paste** displays the selection in dynamics and waits for you to click and define the position for the pasted graphics.

The software does not prompt for position of pasted objects when you use this option. When this option is not selected, and if you click OK, the software requests for the position of copied objects and displays a green outline/red box to help them in positioning.

**💡 TIP** Use PinPoint for precise input. You can use **View** commands to adjust the view to be able to select the paste point.

Clearing this option is possible only if Reference Point is requested by **Copy** command.

### See Also

*Paste and Restore* (on page 145)

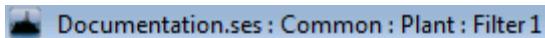
*Paste* (on page 138)

*Restore Model Objects from Backup* (on page 146)

## Paste and Restore

Performs a partial restore of plant mode objects from a backup, maintaining the identity, name, location, and relationships of the copied objects. You can select and copy objects from a backup model and paste them into the active model. The command is located on the **Edit** menu.

**TIP** It is often helpful when using this command to verify which session is active. You can view the name of the current session, task, model, and active filter on the title bar of the application and on the Windows task bar.



### Partial Restore

To use **Paste and Restore** for a partial restore, your project administrator must back up the current model in the Project Management task. When you need to restore objects from a backup of the model data, the project administrator makes the backup data available as an additional model in the Project Management tree using the **Restore model for selective recovery of model objects** option in the **Restore Wizard**. For more information, see *Restore a Backup Model for Selective Recovery in an Active Model* in the *Project Management User's Guide*.

**NOTE** **Paste and Restore** does not support selective recovery of marine and material handling model objects.

The process for restoring selected objects from a backup is a simple copy-and-paste from one model to another. The behavior is as follows:

### Property Values

All property values from the backup are restored to the object with the following exceptions: **Modified Date** and **Modified By**, both of which reflect the current values when you use **Paste and Restore**.

### Permission Groups

To use **Paste and Restore**, you must have write access to the permission group for both the active and the backup versions.

**Paste and Restore** uses the active permission group if the original permission group of the object is not in the target model. The original permission group may have been deleted from the target model or may never have been in the target model. This situation can arise when you are importing objects from other models to reference.

### Status

If an object in the backup version has an **Approved** status, the **Paste and Restore** command sets the status back to **Working** in the active model. If any object selected for **Paste and Restore** in the active model has an **Approved** status, you cannot use the **Paste and Restore** command.

### Restoring Copied Objects

When attempting to restore copied objects, the following error may occur: *The copied object(s) cannot be restored*. **Paste and Restore** is unable to restore objects in the select set that have been copied into the current model. After you click **OK**, the command cancels. If only one object

was in the select set when the error occurred, the object cannot be restored. If more than one object was in the select set, you have the following options:

- You can copy a smaller set of objects and try the command again
- You can restore the whole model from backup and re-model the work done since the backup.
- Objects that cannot be restored have to be remodeled. In some cases, this error may be related to connections between objects (like structural members), where objects have been moved or connections have changed since the backup.

## Restoring Drawing Volumes

When a drawing volume is associated to a drawing document (that is, volume drawings or drawings associated with spatial drawing components), copying the drawing volume results in copying the drawing sheet objects as well. When you paste the drawing volume, you specify the **Space folder** for the drawing volume. All other paste options are derived from the previous parent object.

## Design Basis

When you run **Paste and Restore**, the software sets the correlation relationship to the state from the backup. If the object was not correlated, the relationship is removed.

### NOTES

- If problems occur when using **Paste and Restore**, refer to the *Troubleshooting Reference Guide* accessed with **Help > Printable Guides** for additional information.
- When using **Paste and Restore**, the **Selection** column of the **Paste** dialog box displays the original system associated with the object. You can change the association by selecting a different system in the **Workspace Explorer**. If the original system associated with the object has been deleted from the active model, then the **Selection** column of the **Paste** dialog box is blank. You can create a new association by selecting a system in the **Workspace Explorer**.

## Restore model objects from backup

### NOTES

- You need write access to both the current and backup versions of the model to use **Paste and Restore**.
- If any object selected for **Paste and Restore** in the current model has an **Approved** status, you cannot use **Paste and Restore**.
- 1. Open a session in Smart 3D that points to a model restored from a backup of the current model.

 **NOTE** To use **Paste and Restore** for a partial restore, your project administrator must back up the current model in the Project Management task. When you need to restore objects from a backup of the model data, the project administrator makes the backup data available as an additional model in the Project Management tree using the **Restore model for selective recovery of model objects** option in the **Restore Wizard**. For more information, see *Restore a Backup Model for Selective Recovery in an Active Model* in the *Project Management User's Guide*.

2. In a graphic view or the **Workspace Explorer**, select objects in the backup model.
3. In the Common task, select **Edit > Copy**.
4. Click a reference point (From point) on an object in the select set.
- ! TIP** You can click any point, as Paste and Restore enforces the **Paste in place** option.
5. Open another session in Smart 3D that points to your current model.
6. In the Common task, select **Edit > Paste and Restore**.  
*The Paste dialog box displays. The Selection column shows the original system and relationships associated with the object.*
7. Provide information as required to complete the paste operation, and then click **OK**.  
*Backup versions of the objects are restored to the current model. Relationships are adjusted, depending on permissions. The To Do List is updated if necessary.*
8. Delete any restored objects that are not needed.

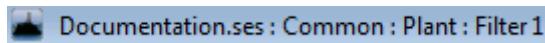
### Returning the current model to the state of the backup model

If you are returning everything in the current model to the state of the backup model, you must delete any objects that were created after the restore date.

1. Use **Tools > Select by Filter** to create a filter to find any objects created after the creation date of the backup database.
2. In the **Locate Filter**, click **More** and select your new filter.
3. Click **Select**  and fence-select the entire model in a graphic view.  
*The objects with creation dates later than the filter highlight.*
4. Click **Delete** .

### NOTES

- It is often helpful when using this command to verify which session is active. You can view the name of the current session, task, Model, and filter on the title bar of the application and on the Windows task bar.



- You can change the graphic display in the backup model graphic view to show a clear visual difference between the two models by changing the background in **Tools > Options**.
- When using **Paste and Restore**, the **Selection** column of the **Paste** dialog box displays the original system associated with the object. You can change the association by selecting a different system in the **Workspace Explorer**. If the original system associated with the object has been deleted from the active model, then the **Selection** column of the **Paste** dialog box is blank. You can create a new association by selecting a system in the **Workspace Explorer**.

## Copying and Pasting Using the Catalog

The **Copy to Catalog** and **Paste from Catalog** commands take the functionality of the standard **Copy** and **Paste** commands to a broader level while you work in an editing session in the model. These commands allow you to copy a set of objects and then later paste the objects into another model that uses the same catalog. The software does not require these objects to have a functional relationship.

**NOTE** You must have write permission to the permission group of the catalog module folder to which you are copying the objects.

After you start the **Copy to Catalog** command, you must identify the user type or module. Module types are available in the reference data as the result of a previous bulkload. Delivered module types reside in the **ModuleTypes.xls** workbook. The path on the administrator computer is *[Product Folder]\CatalogData\Bulkload\DataFiles*. Also, you can access this folder by selecting the **Project Management** option during workstation setup. For more information, see the *Reference Data Guide* available from the **Help > Printable Guides** command in the software.

Next, you identify a set of objects in the model that you want to copy for placement in the Catalog. The software offers the option to include parent objects for the set you selected.

In effect, the Catalog is serving as a clipboard to store copied objects from the **Copy to Catalog** command until you decide to place the objects with the **Paste from Catalog** command. You can paste the objects by selecting the module in the Catalog, in the same manner that you select equipment from the Catalog.

You can choose to paste the objects to another model or within the same model. The results of the **Paste from Catalog** command match the functionality of the standard copy and paste operation. After you finish the command, the software displays the ribbon associated with the selected set of objects.

For example, you have copied associated graphics from multiple applications with the **Copy to Catalog** command. When you paste the graphics with the **Paste from Catalog** command, the software establishes the relationships to the required parents or inputs, similar to the standard **Paste** command. As a result, you can save and re-use modules that contain application objects. The **Paste from Catalog** command uses the standard paste functionality, in addition to special prompts and the definition of the point that you used, to paste the saved graphics.

### Topics

Copy to Catalog .....	149
Paste from Catalog .....	152

## Copy to Catalog

Copies a set of objects to the Catalog in a module that you designate. After you complete the command, the copied objects are available to all users to access as needed. The objects you copy do not need to share any type of functional relationship. The type of module you select determines the properties of the objects.

 **NOTE** If the associated specification data, part data, symbols, or other reference data are not also copied from the source catalog into the target catalog, an error message displays when you use the **Paste from Catalog** command. Possible error messages are listed below:

- The PasteFromCatalog command succeeded. However some external objects are missing and may impact the final result. For more information, please refer to the 'SP3D\_Paste\_MissingExternalObject.log' file. Would you like to view the file now?
- The catalog information required by this module is not found. The module should be deleted and recreated using your current catalog data.

The modules exist in the reference data as defined by the bulkload of module types. The reference data stores the following information for the module:

- Name, description, and type of module that stores the data in the Catalog
- Properties associated with the model type that allow you to search in the Catalog for a select set
- The copied objects, which the software assigns to a common permission group for reference data
- Identity of the input objects
- Parent objects of the copied objects
- Graphics for the inputs that display in the placement window
- List of permission groups to which each copied object belonged
- Stored object in the Catalog that controls all of this data as a row in a user folder

For more information about the modules that the **Copy to Catalog** command uses, refer to the *Reference Data Guide* available from the **Help > Printable Guides** command in the software.

 **NOTE** You must have write permission to the permission group of the catalog module folder to which you are copying the objects.

### Copy to Catalog Ribbon

Provides options for copying a set of objects to the Catalog.

#### Properties

Displays the **Module Properties** dialog box so you can review or edit the properties. For more information, see *Module Properties Dialog Box* (on page 151).

#### Select

Specifies the objects to copy.

 **Placement Point**

Allows you to click in the model to locate the placement point.

 **Define Prompts**

Changes the stored prompts during the copy operation.

**Finish**

Saves the copied objects to the database.

 **Cancel**

Clears the selected objects.

 **Accept**

Accepts the selected objects.

**Name**

Specifies a unique name for the set of objects.

**Type**

Specifies the module type for the copied objects.

## ***Copy objects to the Catalog***

1. Click **Edit > Copy to Catalog**.
2. Select a set of objects to copy to the Catalog.
3. Click **Accept** .
4. In the **Name** box, type a name for the set of objects.  
 **TIP** The name you record must be unique from all other names in the Catalog.
5. In the **Type** box, check the module type and change it if necessary.
6. Click a location in the model to define the placement point of the module. This placement point is used during the paste operation.
7. On the **Define Prompts** dialog box, confirm or change the values assigned to the description and selection. These values describe the relationships of the objects.
8. Click **Finish**. The software adds the objects to the Catalog.

 **NOTES**

- You can select the objects before clicking **Edit > Copy to Catalog**.
- Before clicking **Finish**, you can click **Properties** on the ribbon to define values for the properties of the module.

## Define Prompts Dialog Box

Changes the stored prompts during the copy and paste operation. You can change the description text in the left column on this dialog box.

## Module Properties Dialog Box

Accesses the properties for the module used with the **Copy to Catalog** command. The information in the **Type** box determines the properties of the module object in the Catalog. The types in the list reside in the reference data after a bulkload has been completed.

### See Also

*General Tab (Module Properties Dialog Box) (on page 151)*

*Configuration Tab (on page 151)*

### General Tab (Module Properties Dialog Box)

Reviews and modifies descriptive information about the module you specify during the **Copy to Catalog** command.

#### Name

Displays the name of the module.

#### Description

Provides a phrase to describe the module you selected.

### See Also

*Module Properties Dialog Box (on page 151)*

### Configuration Tab

Displays the creation, modification, and status information about an object.

**NOTE** You cannot define the filters using the **Configuration** tab.

#### Plant

Displays the name of the model. You cannot change this value.

#### Permission Group

Specifies the permission group to which the object belongs. You can select another permission group, if needed. Permission groups are created in Project Management.

#### Transfer

Reassigns ownership of the selected model objects from their current permission group to another satellite or host permission group. This option is only available if the active model or project is replicated in a workshare configuration. The option is not available if all of the objects in the select set already belong to another location and are non-transferable. For more information, see *Transfer Ownership Dialog Box* in the *Common User's Guide*.

**NOTE** The **Transfer** option does not apply to the filters and surface style rules.

#### Approval State

Specifies the current status of the selected object or filter. The display depends on your

access level. You might be unable to change the status of the object. The list is defined by the ApprovalStatus codelist.

 **NOTE** You can only edit or manipulate an object with a status of **Working**.

#### Status

Specifies the location of the object in the workflow process. Changing this property sets the **Approval State**. The list is controlled by the ApprovalReason codelist in the ApprovalReason.xls file. You must bulkload this file. For more information, see *ApprovalReason* in the *Reference Data Guide*.

#### Date Created

Specifies the creation date of the object.

#### Created by

Specifies the name of the person who created the object.

#### Date Last Modified

Specifies the date when the object was last modified.

#### Last Modified by

Specifies the name of the person who last modified the object.

## Paste from Catalog

Accesses a select set in the Catalog. This select set is the one that you processed with the **Copy to Catalog** command. You can access the multiple, copied objects in the same way you select equipment in the Catalog.

#### NOTES

- Before selecting **Edit > Paste from Catalog**, select the destination system in the **Workspace Explorer**.
- If the associated specification data, part data, symbols, or other reference data are not also copied from the source catalog into the target catalog, an error message displays when you use the **Paste from Catalog** command. Possible error messages are listed below:
  - The PasteFromCatalog command succeeded. However some external objects are missing and may impact the final result. For more information, please refer to the 'SP3D\_Paste\_MissingExternalObject.log' file. Would you like to view the file now?
  - The catalog information required by this module is not found. The module should be deleted and recreated using your current catalog data.

When you select the **Paste from Catalog** command, the Catalog browser opens in the folder you last accessed with the command. When you open a module in the Catalog, you use the **Paste** dialog box to insert the module information in the target module. The software generates the required part numbers and occurrence names for the individual objects.

The type of module you select determines the properties of the objects. The modules exist in the reference data as defined by the bulkload of module types.

For more information about the modules that the **Paste from Catalog** command uses, refer to the *Reference Data Guide* available from the **Help > Printable Guides** command in the software.

## Paste objects from the Catalog

1. Use the **Copy to Catalog** command to create a set of objects to paste.  
*Copy objects to the Catalog* (on page 150)
2. Select the necessary system in the **Workspace Explorer**.
3. Click **Edit > Paste from Catalog**.
4. On the **Modules** dialog box, browse to the folder under the type of module that contains the copied objects.

**TIP** If you do not select a module, the command stops and the software provides the message **No object selected to paste**.

5. Click **OK**.
6. On the **Place Macro** dialog box, review the options, and adjust as needed.

### TIPS

- You can select an option to keep the original permission groups.
- You can resize the columns on this dialog box as well as resize the entire dialog box in order to more fully view the information.

7. Click **OK**.
8. Click the location in the model where you want to paste the copied objects.

**NOTE** When you finish the paste operation, the objects are no longer organized as a module and can be edited individually as needed.

## Modules Dialog Box

Browses to and selects the module that contains the objects you copied to the Catalog.

### Permission Group

Associates the selected object with a permission group. This drop-down box is available only in the Catalog task.



#### Save

Saves the active row to the Catalog database. This command is available only in the Catalog task.



#### Copy

Copies the selected object. This command is available only in the Catalog task.



#### Paste

Pastes a copied object. This command is available only in the Catalog task.



#### Delete

Deletes the selected object. This command is available only in the Catalog task.

 **Undo**

Reverses the most recent operation. This command is available only in the Catalog task.

 **Insert Row**

Inserts a blank row into the grid view. This command is available only in the Catalog task.

 **Move Up**

Moves the select list entry up one row in the editable grid. This command is available only in the Catalog task.

 **Move Down**

Moves the select list entry down one row in the editable grid. This command is available only in the Catalog task.

 **Properties**

Displays the properties of the selected object. The properties on this dialog box are read-only.

 **Preview**

Opens a bitmap file that was assigned to a part or part class in the reference data.

 **Filter**

Filters the data in the content view to quickly find what you are looking for. This command is available only in the Catalog task.

 **Sort**

Sorts data in the content view by multiple columns to quickly find what you are looking for. This command is available only in the Catalog task.

 **Customize Current View**

Controls which property columns display in the content view and in what order. This command is available only in the Catalog task.

 **List View**

Displays the information in the content view in a list format.

 **Grid View**

Displays the information in the content view in a table format.

 **Check Data**

Checks the consistency of the data in the grid against other data in the Catalog. This command is available only in the Catalog task.

**Address**

Specifies your exact location within the displayed hierarchy.

**See Also**

*Copy objects to the Catalog (on page 150)*

## Place Macro Dialog Box

Confirms the parent or associated objects of the pasted objects. You can change the selection object in the right column.

This dialog box appears when you are pasting objects from the Catalog.

### Description

Provides a description of the input object.

### Selection

Shows the parent associated with the object.

**NOTE** You can resize the columns on this dialog box as well as resize the entire dialog box in order to more fully view the information.

### Delete Optional

Removes the text in the **Selection** column for rows in the grid that start with the word "Optional." This button is useful in large copy-and-paste operations when the grid is filled with many optional tasks, and you want to remove all these items at once.

### Show Clipboard window

Creates a window that displays the Clipboard contents, including the input objects.

### Keep original permission groups

Controls the permission group assignment for the pasted objects. This option is helpful when you are pasting large data sets containing different types of objects (piping, equipment, structure). Here are some important points to remember about this option.

- When this option is selected, the software assigns all pasted objects to the original permission group, as long as you have write access to that permission group.
- When this option is selected, if you do not have write access or if the permission group does not exist (such as in the case when pasting from one database to another), then the software assigns the objects to the active permission group.
- When this option is not selected, the software assigns the objects to the active permission group.

### Paste in place

This option is not available when you are using the **Paste from Catalog** command.

### See Also

*Copy objects to the Catalog* (on page 150)

## Locate Filter

Changes the active **Select** command filter without clearing the select set. You can use locate filters in the software to assist in selection of objects in the workspace. The **Locate Filter** box on the main toolbar displays the active filter.



Each task provides a unique list of available filter options. You can use these filters to perform the following:

- Control the selection of compound (or owner) objects versus selection of the constituent components. For example, in the Piping task, you have the option to locate the run, the parts, or the features of the run.
- Filter on any object independent of the current task.

You can apply locate filters to the highlighting and selection in both the graphic and **Workspace Explorer** views.

Select the **More...** option at the bottom of the list to display the **Select Filter** dialog box. The **Select Filter** dialog box displays all of the simple filters that are set up to accept object type or system objects as discrimination data. You can then select additional filters to add them to this list. Only the selection of filters is available; all other options are disabled. For more information, see *Select Filter Dialog Box* (on page 366).

After you add filters to the list, you can use them just as you would any other filter. For example, you could do the following:

- Select the objects in a 3D view.
- Select the name of the object in the **Workspace Explorer**.
- Fence and select the objects in a 3D view.

Any filters that you add from the **Select Filter** dialog box remain available even if you change tasks. Filters that you add are available only in the active session. These filters are not saved in the session file.

These options are also available when you use CTRL+E to display the **Locate Filter** dialog box or by selecting **Edit > Locate Filter**.

### NOTES

- The objects in the **Locate Filter** list for the **Select** command are defined by the software. They are not the user-defined filters that you can create through the **Define Workspace** or **Select by Filter** commands.
- Another way to specify a locate filter is in the field on the *Select* (on page 348) command ribbon.

## Locate Filter Dialog Box

Specifies a locate filter to use to assist in selection of objects in the workspace. Select **Edit > Locate Filter** to display this dialog box.

### Select locate filter

Displays the currently active locate filter and provides a list of locate filters that can be applied to the selected objects in the workspace.

#### Inside

Specifies that all objects located entirely inside the fence be selected. This setting is the default for the **Select** command.

#### Inside/Overlapping

Specifies that all objects located entirely inside the fence and those outside the fence but touching the fence at some point are selected.

## Delete

 Removes the selected object from the database, and deletes any relationships and notes placed on the object.

Deleting objects can create inconsistencies in your design. However, you can retrieve the data and reconcile the inconsistencies by immediately clicking the **Undo** command. You can refer to the **To Do List** for a list of any inconsistencies created by deleting an object.

You can select and delete an object in any task if you have the appropriate permissions.

You can also restore deleted objects from backup using the *Paste and Restore* (on page 145) command.

 **NOTE** You can also press the DELETE key to delete objects.

### See Also

*Cancel Your Last Action* (on page 136)  
*Undo* (on page 135)

## Move

 Moves objects from one location to another. You specify the original location of the object and then indicate the destination location. You can move one object or select multiple objects to move simultaneously.

The software maintains persistent relationships that exist between objects during a move. For example, if a pump has been mated to a surface that relationship continues to exist even after the pump is moved to another location within the workspace. Remember that relationships may prevent you from moving an object to where you want. For example, the pump cannot be moved off the surface, only to another location on the surface. You may need to delete relationships to move an object to its new location.

## Reconnecting Route Objects with Unfinished Ends

When you move or modify a route object in HVAC, Electrical, or Piping, Smart 3D treats any unfinished ends as free end features. An unfinished end is an end with mating parts or a logical data connection with one logical port. You can reconnect using these free end features. This behavior allows you to reuse existing mating parts and connections and reduces wait times.

### Move Ribbon

Provides commands and options for relocating any object that supports moving. This command gives functionality for a generic move. You can move more than one object at the same time.

#### Move From

Identifies the starting point of the move. If you do not define a starting point, the current location of the selected object is assumed to be the starting point.

#### Move To

Identifies the end point of the move. During the move operation, you can use **PinPoint**, **Point Along**, and SmartSketch 3D relationship indicators. The SmartSketch indicators help with moving parallel to other objects or along a major axis to offset from an object. If you do not want the selected objects to move with the pointer during the **Move To** step, press F10.

#### Plane

Activates options for selecting a working plane for the move. The icon on the ribbon changes depending on your selection. The default selection is **No Plane**. The options include:

##### Plan Plane

Defines the work surface as the XY plane. You can also press CTRL+1 to select this option.

##### Elevation Plane: East-West (Z Plane: X-Axis)

Defines the work surface as the XZ plane. You can also press CTRL+2 to select this option.

##### Elevation Plane: North-South (Z Plane: Y-Axis)

Defines the work surface as the YZ plane. You can also press CTRL+3 to select this option.

##### Plane by Turn/Branch

Defines the work surface as the plane defined by an existing turn or branch. You select the turn or branch to set the plane. You can also press CTRL+4 to select this option.

##### Plane by Three Points

Defines the work surface using three points you define. You can also press CTRL+5 to select this option.

##### No Plane

Clears any work surfaces. The software does not project points that you place to any plane. You can also press CTRL+6 to select this option.

### Lock Pinpoint

Locks object coordinates for the **Move To** point if the **PinPoint** ribbon bar is active when the

**Move** command is started. If **PinPoint** is not enabled when the **Move** command is activated, the **Lock PinPoint** option is disabled. By default, **Lock Pinpoint** is not selected.

- If **Rectangular Coordinates**  is selected on the **PinPoint** ribbon, the **E**, **N**, and **El** values are locked.
- If **Spherical Coordinates**  is selected on the **PinPoint** ribbon, the **Distance**, **Horizontal**, and **Vertical** values are locked.
- If **Cylindrical Coordinates**  is selected on the **PinPoint** ribbon, the **Radius**, **Theta**, and **Z** values are locked.

#### Fast move

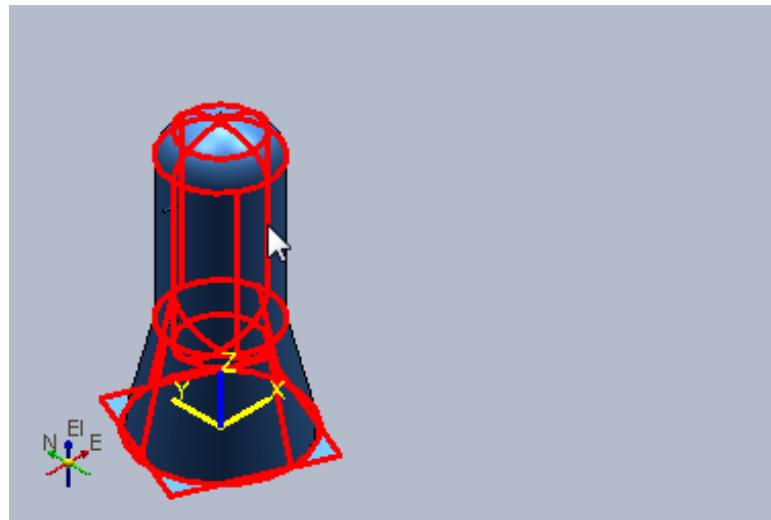
Displays a range box around the objects that you are moving instead of the wireframe outline of each object. This option enhances performance when working with large select sets.

#### What do you want to do?

- *Move objects to a new location* (on page 159)
- *Move partially constrained objects by a relative distance* (on page 161)
- *Copy and paste an object* (on page 142)

## Move objects to a new location

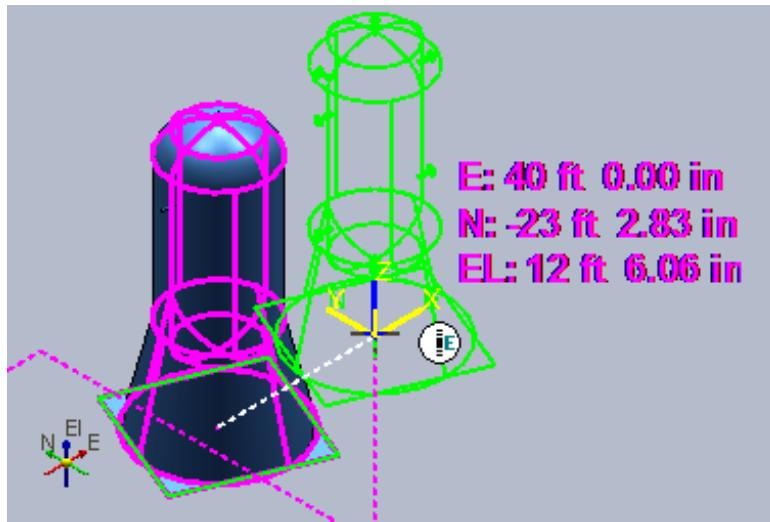
1. Click **Select** .
2. Select the objects to move.



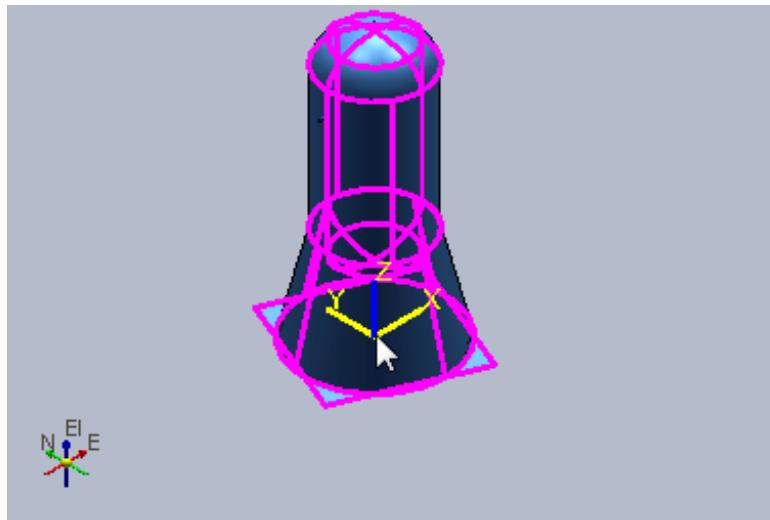
3. Click **Move**  on the main toolbar, or select **Edit > Move**.

---

4. Click the location to which to move the objects. Use **Tools > PinPoint** to help you.

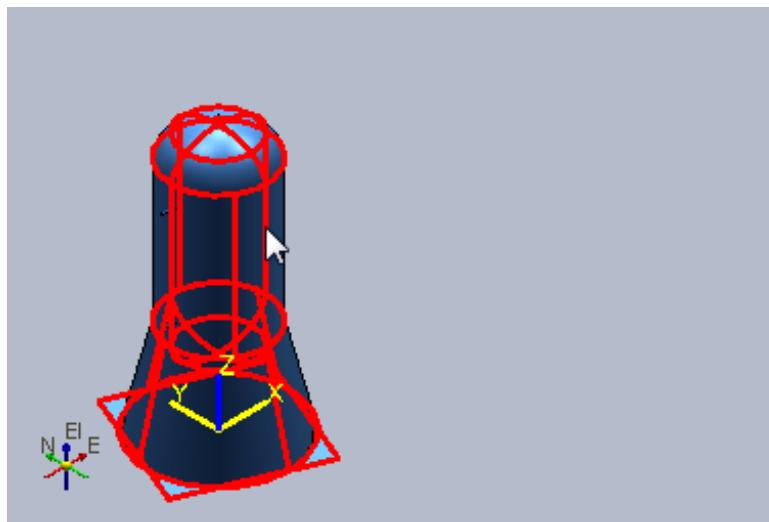


5. Right-click to end the command.

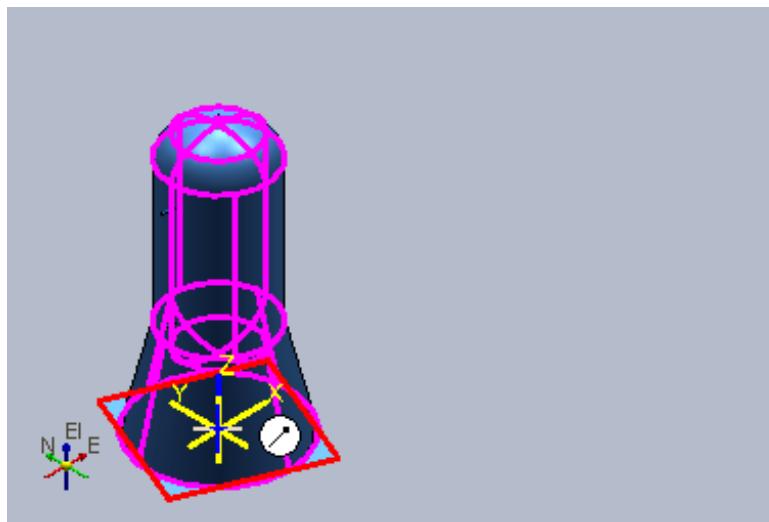


## Move partially constrained objects by a relative distance

1. Select Tools > Pinpoint.
2. Turn on the **Relative Tracking**  option on the **PinPoint** ribbon. For more information, see *PinPoint* (on page 387).
3. Select the objects to move.



4. Click **Move**  on the main toolbar, or select **Edit > Move**.
5. Click **Move From** .
6. Select the **Lock Pinpoint** option.
7. Select the point in the model to move from.

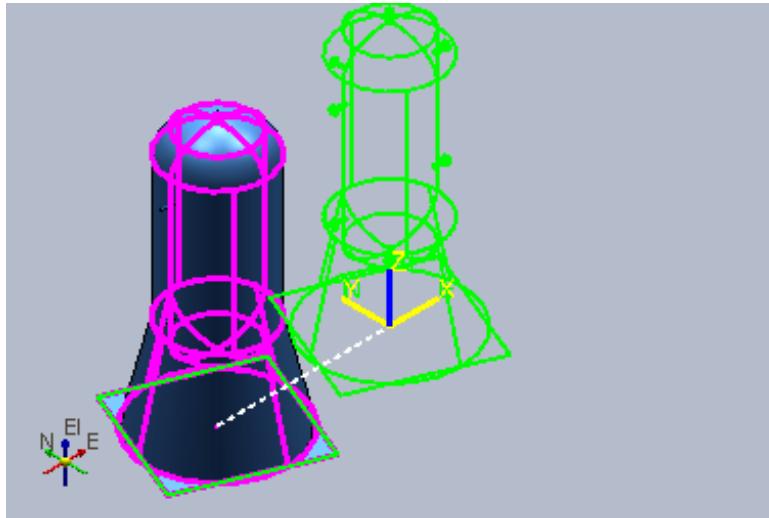


The **X**, **Y**, and **Z** boxes display 0.

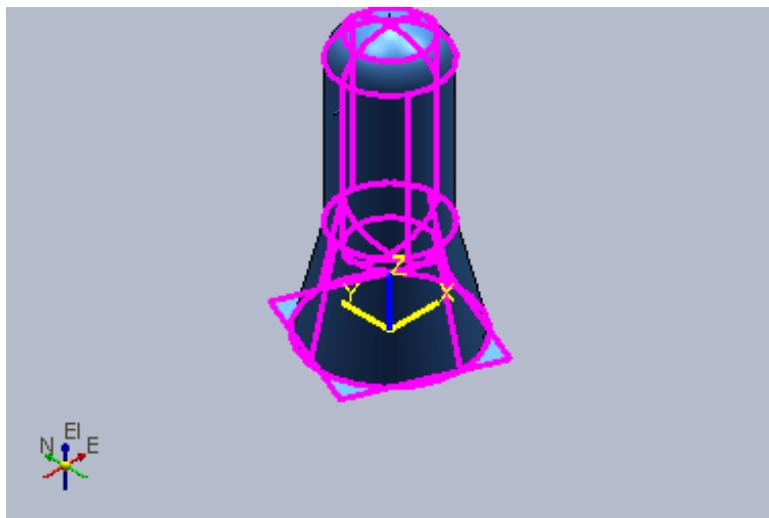
E:  0 ft 0.00 in	N:  0 ft 0.00 in	B:  0 ft 0.00 in
---	---	---

8. Press F6, and type the **X** delta distance for the move.
9. Press F7, and type the **Y** delta distance for the move.
10. Press F8, and type the **Z** delta distance for the move.

*The objects move to the new coordinates and display as a preview.*



11. Left-click to accept the move.



## Select System Dialog Box

Displays applicable systems so you can select the system you want.

### Look in

Specifies where you want to look for the system. Select **Workspace** to look for the system in your defined workspace only. Select **Database** to look for the system in the entire Model database regardless of the workspace filter.

### See Also

[Move \(on page 157\)](#)

## Rotate Object

 Rotates or turns selected objects after the initial placement of the objects. For precision needs, you can define the angle and an incremental step value. To view objects in the model from a different angle, use the **Rotate View**  command instead.

To use this command, select an object, and click **Rotate Object** . Then, specify the axis of rotation by a point (the axis position point) and a direction. You can also relocate the position point for the axis of rotation, if necessary.

After defining the axis of rotation and position point, define the angle of rotation. One way to define the angle is by moving the mouse in a drag-and-drop operation. Another way to define the angle is to type a value in the **Angle** box. You can also specify a **Step** value that represents an incremental angle value. A third way to define the angle is by comparing and changing the angle between a reference plane or line on the rotation object with a reference plane or line on a stationary object in the model. In this mode, you use the **Reference on Rotation Object** and **Reference on Stationary Object** buttons on the ribbon.

### NOTES

- If the component has more than one constraint, you cannot rotate it. If the object is not fully constrained, you can rotate it at any time.
- If the object has a mate relationship to a surface, you can only rotate the object about the axis that is perpendicular to the surface, which the software selects by default. The default point of rotation is the origin of the object.
- If you are rotating structural members, be sure to select all the members and the coordinate system that you want to rotate. If you select just the coordinate system, the members will rotate but the rotation angle of the members themselves will not change.

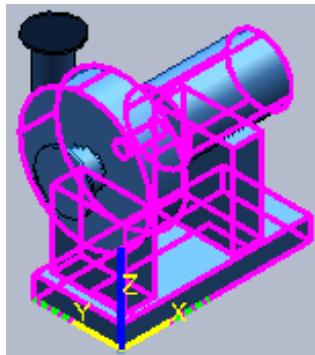
### Rotate Object Ribbon

Sets options for rotating objects in the model. You cannot rotate objects with certain constraints. For example, you cannot rotate a pump that is mated to a horizontal reference plane and aligned with other pumps on either side. That rotation would violate at least one relationship.

#### Axis direction

Defines the direction of the axis of rotation. You can select one of the predefined axes or specify a different direction. The following graphic shows the default rotation coordinate system for an object. The axes are parallel to the axes of the active coordinate system. The

default origin of the coordinate system is the connect point of the object.

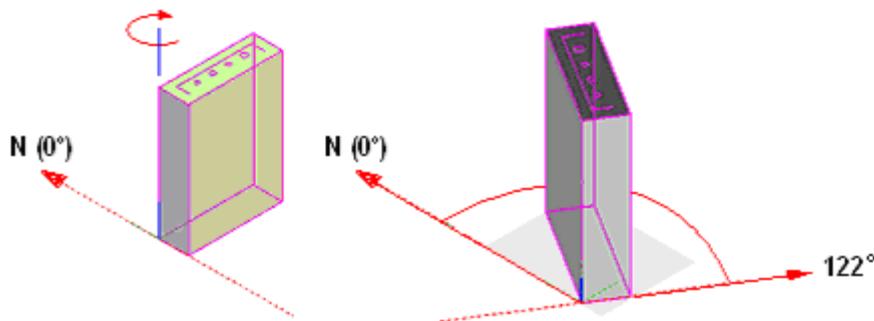


To choose a different axis direction, you can complete one of the following actions:

- Select one of the axis directions parallel with the active coordinate system (Up/Down, N/S, or E/W) from the Axis direction box. Or, select an axis directly on the rotation triad graphic in a graphic view.
- Select **Perpendicular to both References** to use the rotation axis direction perpendicular to both a reference on the object and a reference in the model. This allows a single rotation about the axis at the rotation point to make the two references parallel. Generally, the **Angle** will be set to 0.
- Select **Select Graphically**, and then click the line or port about which to rotate the object in the graphic view. You can also select a cylinder to define the axis of the cylinder as the axis of rotation. If a line is selected, the line becomes the axis of rotation for the object. If a port is selected, the axis position point changes to the coordinate system origin of the port.

### Bearing

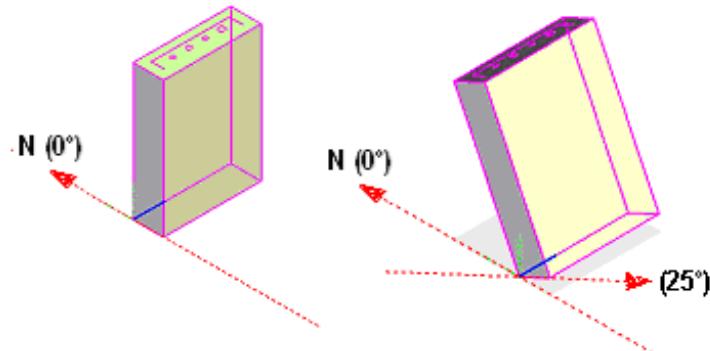
Specifies the bearing angle for the object. The **Bearing** angle is measured between the local x-axis of the object and the Y-axis (North) of the global coordinate system in the XY-plane. The local x-axis is the default axis of primary symmetry for all symbols in the catalog. The bearing measurement direction is clockwise from the active coordinate system North looking in the negative active coordinate system direction; that is, down from 0 to 360 degrees. You can enter negative bearing angles, but the software automatically converts them to the positive equivalents. If the pitch is set to +/- 90 degrees, then the bearing measure displays 0 degrees.



### Pitch

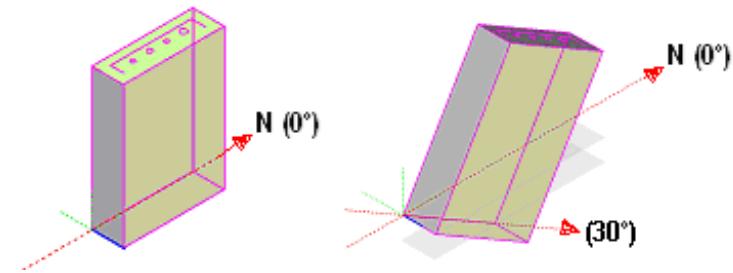
Specifies the pitch angle for the shape. The **Pitch** angle measures between the x-axis of the

object and the X-axis of the global coordinate system in the XZ-plane. This option sets the reference in the model to a line that is the intersection of the vertical plane through the X-axis of the local coordinate system and the active coordinate system horizontal plane. The angle is measured in the positive direction from the horizontal plane in the active coordinate system up direction regardless of the current bearing. Another way to describe pitch is the rotation of the object about its y-axis. Pitch angles are limited to between -90 degrees and +90 degrees, with 0 indicating horizontal.



### **Roll Angle**

Specifies the roll angle for the object. The **Roll** angle measures between the local z-axis of the object and the Z-axis of the global coordinate in the YZ-plane. Another way to describe roll is the rotation of the object about its x-axis. This option sets the reference in the model to a line that is perpendicular to the local coordinate system x-axis and in the horizontal plane. Roll angles are measured clockwise from horizontal to the y-axis of the local coordinate system. The roll angle is between 0 and 360 degrees. You can enter negative roll angles, but the software automatically converts them to the positive equivalents. If the pitch is set to +/- 90 degrees, then the reference in the model is the North axis.



### **Axis Position Point**

Defines the origin point for the axis of rotation. This point is stationary during the rotation, as is any point on the axis of rotation. To move the axis of rotation to a different location in the model, you can click **Axis Position Point**, and then click in the graphic view at the location of the origin. The default is the object origin. If there is no defined origin, the origin is the center of the range of the selected objects.

### **Reference on Rotation Object**

Instructs the software to use the selected part face or edge as the rotation reference, and sets the local coordinate system for the rotation of the object. The **Angle** box displays the angle between the selected references as projected against the measurement plane.

### **Reference on Stationary Object**

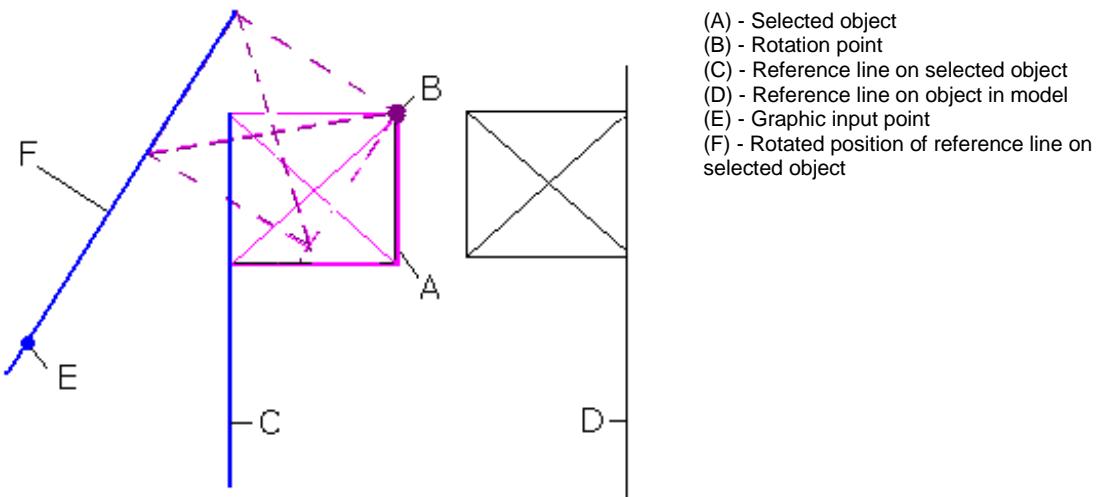
Defines a reference plane or line on another object in the model and selects the global coordinate system for the rotation of the object. The **Angle** box displays the angle between the rotation object and the stationary object as projected against the measurement plane.



### Rotate by precision graphic input

Allows you to click a point in the model to graphically orient the object. You can use the SmartSketch relationship indicators to locate the point.

The following picture shows a graphic input point (E) and reference lines (C) and (D).



### Angle

Allows you to type the number of degrees for the angle of rotation to apply to the object. This option also dynamically displays the current angle during manual rotation. This option is helpful if you need to have a precise value for the rotation angle.

When you use a reference plane or line on the rotation object and a reference plane or line on a stationary object in the model, the Angle box shows the angle between these two references.

### Step

Defines an incremental or step value for dynamic rotation. When you rotate objects, the object rotates to an angle equal to some multiple of the step value.

### Close

Completes the command.

### Fast rotate

Displays a range box around the objects that you are rotating instead of the wireframe outline of each object. This option enhances performance when working with large select sets.

**NOTE** If you do not want to view all of the objects in your workspace during rotation, you can use **Tools > Hide** to remove unwanted objects from the view. To restore the objects to the display, click **Tools > Show**.

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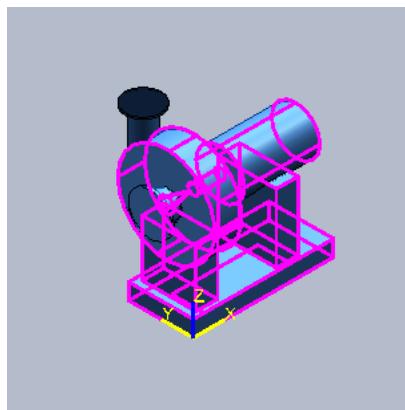
### What do you want to do?

- *Rotate an object about an axis* (on page 167)
- *Rotate an object using perpendicular to references mode* (on page 169)
- *Rotate an object about a line or port* (on page 171)
- *Rotate an object using bearing, pitch, or roll* (on page 172)

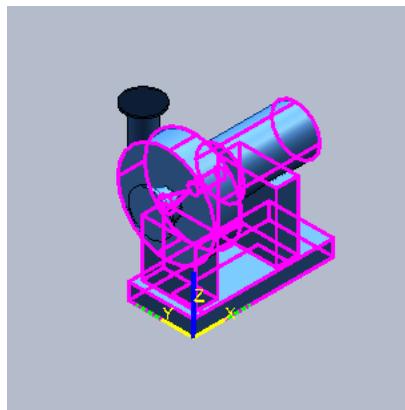
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## Rotate an object about an axis

1. Select the object to rotate.

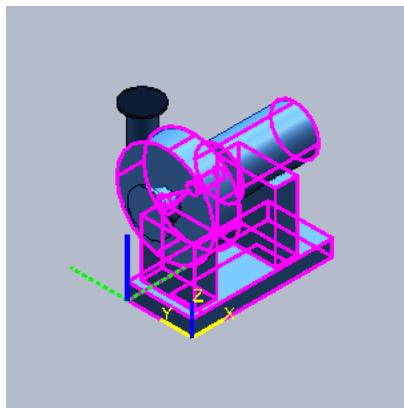


2. Click **Rotate Object**  on the main toolbar.



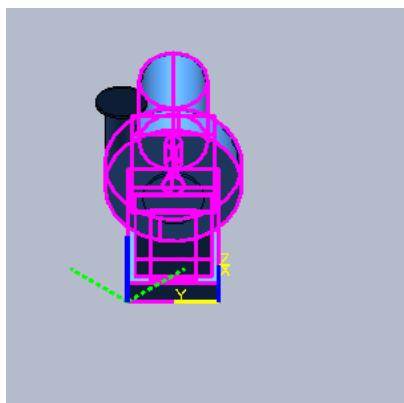
3. In the **Axis direction** box, select one of the axis directions parallel with the active coordinate system: **N/S-**, **E/W-**, or the **Up/Down-axis**. Or, select an axis directly on the rotation triad graphic in a graphic view.

4. If necessary, move the axis of rotation to a different location in the model by clicking **Axis Position Point** , and then click in the graphic view at the location of the origin.



5. In the **Angle** box, define the degree of the angle of rotation by typing a value or by dragging the object to define the angle.

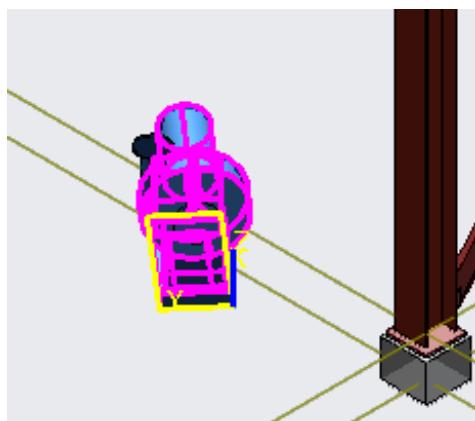
 **TIP** As you drag the object, the software displays the rotation about the axis. The **Angle** box dynamically displays the value of the angle.



6. In the **Step** box, you can type the increment value used for the dynamic rotation input. The default value is blank.
7. Click **Close**.

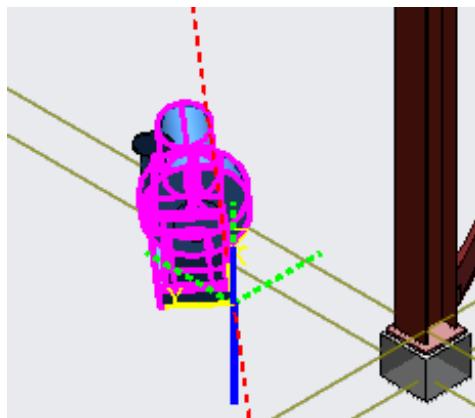
## Rotate an object using perpendicular to references mode

1. Select the object to rotate.



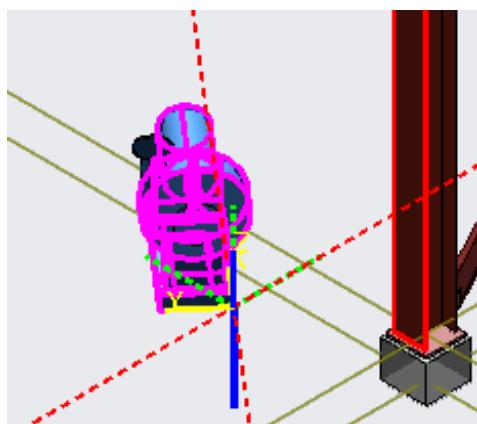
2. Click **Rotate Object** on the main toolbar.
3. Select **Perpendicular to both References** from **Axis direction**. This option uses the rotation axis direction that is perpendicular to both a reference on the object and a reference in the model.

*A dashed line appears representing the rotation axis on the object.*



4. If necessary, click **Axis Position Point** to move the axis of rotation.
5. If the reference is on the object, click **Reference on Rotation Object** , and select a line or plane to use as a reference on the object being rotated.
6. Click **Reference on Stationary Object** , and select a line or plane to use as a reference on another object in the model.

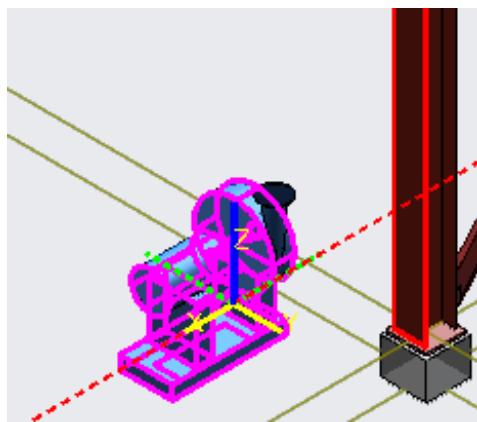
A second line appears and the angle between the two lines displays in the **Angle** field.



7. Click **Rotate by precision graphic input** on the ribbon. This option allows you to click a point in the model to orient graphically the object using a reference on the object. You can use the SmartSketch relationship indicators to locate the point.

-OR-

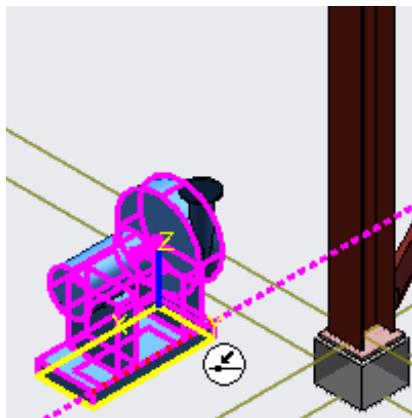
In the **Angle** box, type the angle that you want between the reference plane (dashed line) on the rotation object and the reference plane (dashed line) on the stationary object.



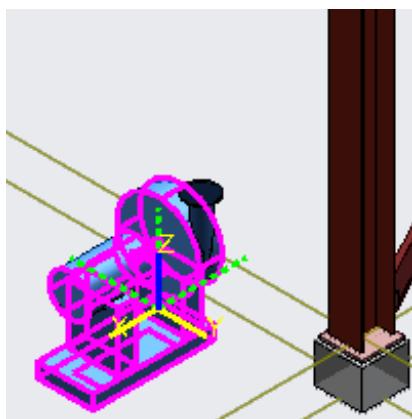
8. Click **Close**.

## Rotate an Object about a Line or Port

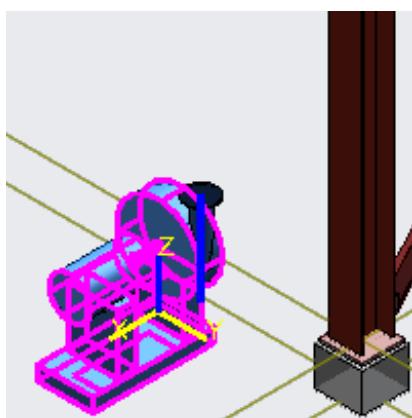
1. Select the object to rotate.



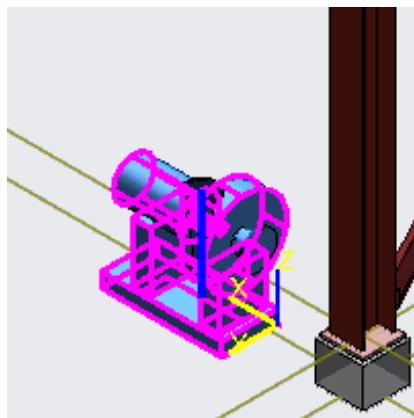
2. On the main toolbar, click **Rotate Object** .



3. In the **Axis direction** box, select the **Select Graphically** option, and then click a line or port about which to rotate the object in the graphic view. For example, you can select a nozzle to specify that the axis of the nozzle cylinder is the axis of rotation.



- In the **Angle** box, define the rotation by typing a value or by dragging the object to define the angle.



- Click **Close** when you are finished rotating the object.

## Rotate an object using bearing, pitch, or roll

- Select the object that you want to rotate.
- On the main toolbar, click **Rotate Object** .
- In the **Axis direction** box, select the **Bearing**, **Pitch**, or **Roll** options for the direction of the axis of rotation.

### TIPS

- The **Bearing**, **Pitch**, and **Roll** options set both the axis of rotation and default measurement references.
- When the pitch is +/- 90 degrees, the bearing measure is indeterminate.

- If necessary, move the axis of rotation to a different location in the model by clicking **Axis Position Point** , and then click in the graphic view at the location of the origin.
- For more precision in rotating, you can click **Rotate by precision graphic input** 

 **TIP** This option allows you to click a point in the model to graphically orient the object using a reference on the object. You can use the SmartSketch relationship indicators to locate the point.

- In the **Angle** box, define the rotation by typing a value or by dragging the object to define the angle.
- In the **Step** box, you can type the increment value used for the dynamic rotation input. The default value is blank.
- Click **Close** when you are finished rotating the object.

## Mirror Copy

 Produces a duplicate image of an object or a set of objects at a location you specify in the model. The mirrored objects are identical in form, but the image is reversed and copied to the selected destination. However, certain settings, particularly the properties for rotation and part replacement, can cause differences between the original object and the mirrored object.

The command is especially useful when you need to copy multiple, connected objects to the opposite side of a symmetrical configuration. For example, you can select an array of pipe runs and generate mirrored images of all their components, geometrical structure, and properties assigned to the pipe runs.

The direction of the mirrored objects is perpendicular from the mirror plane (the plane about which the software flips the selected objects). The mirror plane and its location determine the exact location of the objects. The software places the mirrored objects at a point that is an equal distance from, and perpendicular to, the mirror plane.

 **NOTE** You cannot use the **Mirror Copy** command on hangers and supports objects.

The command processing includes the following functions:

- Copy and flip the copy
- Flip in the direction that you specify
- Move or copy the flipped object to a position you specify
- Change or copy properties appropriately

The mirroring and flipping is based on settings in the reference data. The result is a mirrored object that is identical to the object at the origin, but the mirrored object is reversed, moved, and copied. The only exceptions can occur from restrictions that exist in reference data settings for rotation or part replacement. The select list, **Mirror Behavior Option**, appears on the part class sheets for reference data. The option has various settings:

- Component may be mirrored
- Component may be rotated 180 degrees, but not mirrored
- Component cannot be mirrored or rotated, but can be copied and translated
- Component must be replaced rather than mirroring, rotating, or copying

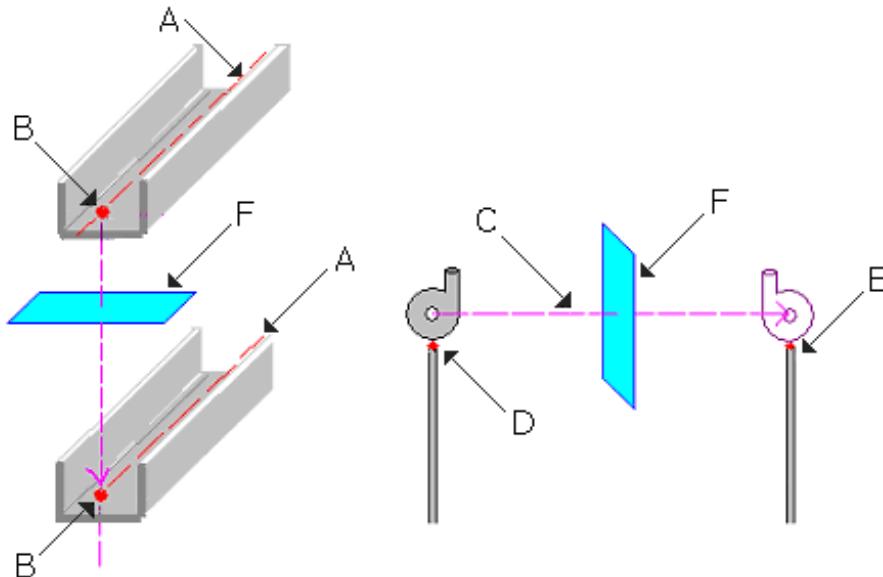
### Understanding Mirroring and Copying Terminology

The **Mirror Copy** command performs various mathematical calculations to provide a mirrored image of objects you select. Understanding the terminology used during these calculations can help with your work in the model. Following the definitions, a picture explains the nature of the processing by the software.

- Centerline - Centerline of the volume of an object. In the graphic, the centerline is labeled (A).
- Centroid - Center point of the volume of an object. In the graphic, the centroid is labeled (B).
- Direction of flip - Vector perpendicular to the mirror plane. An arrow points in the direction toward which the flip goes. In the graphic, the flip direction is labeled (C).
- Mirror destination - Corresponds to the **Move To** point you specify in the model. In the picture, the mirror destination is labeled (E).

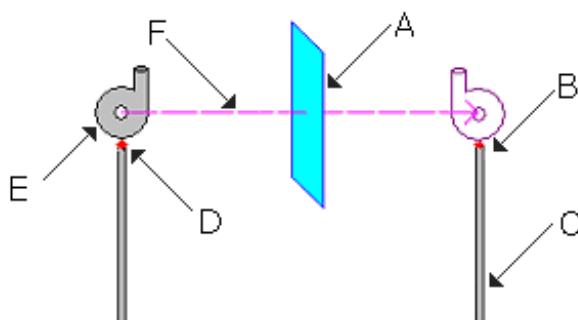
- Mirror origin - Corresponds to the **Move From** point, or the origin of the objects you want to mirror. In the picture, the mirror origin is labeled (D).
- Mirror plane - Plane about which the software flips the selected objects. In the picture, the mirror origin is labeled (F).

The following picture explains the nature of the processing by the software.



- (A) - Centerline
- (B) - Centroid
- (C) - Direction of flip
- (D) - Mirror origin (or **Move From** point)
- (E) - Mirror destination (or **Move To** point)
- (F) - Mirror plane

The command processing requires a series of steps. First, you identify one or more objects you want to mirror and copy. Then you define the mirror plane, which is the plane about which the software flips the objects you select. Also, the software prompts you to specify the starting point (or move from) and the destination point (or move to). The following graphic summarizes the processing:



- (A) - Mirror plane
- (B) - Mirror destination (or **Move To** point)
- (C) - Pipe (typical)
- (D) - Mirror origin (or **Move From** point)

(E) - Equipment (typical)  
(F) - Direction of flip

### Mirror Copy Ribbon

Sets options for mirrored and copied objects.

#### Select

Selects objects to mirror and copy.

#### From Point

Sets a starting point for the mirroring and copying operation. This point is also called the *from point*.

#### To Point

Sets an end point for the mirroring and copying operation. This point is also called the *to point*.

#### Parent or Related Object

Selects a parent for the mirrored and copied objects. For more information, see *Parent or Related Object Dialog Box* (on page 178).

### Finish

Mirrors and copies the objects using the defined options.

#### Cancel

Rejects the selected objects.

#### Accept

Accepts the selected objects.

### Direction

Selects the direction of the mirror plane.

#### Plane by From-To Vector

Defines the mirror plane as normal to a vector between the *from point* and the *to point*. You can also press CTRL+6 to select this option.

#### Plan Plane

Defines the mirror plane as the XY plane. You can also press CTRL+1 to select this option.

#### Elevation Plane: East-West (Z Plane: X-Axis)

Defines the mirror plane as the XZ plane. You can also press CTRL+2 to select this option.

#### Elevation Plane: North-South (Z Plane: Y-Axis)

Defines the mirror plane as the YZ plane. You can also press CTRL+3 to select this option.

### Destination Mode

Specifies the destination, which can be the *to point* or a point to mirror about.

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### What do you want to do?

- *Mirror and copy objects* (on page 176)
- *Construct symmetrical connections* (on page 177)

---

## Mirror and copy objects

1. Click **Edit > Mirror Copy**.
2. Select the objects in the model to mirror and copy.
3. Click **Accept** to confirm your selection.
4. Under **Direction** on the ribbon, specify the direction of the mirror plane. By default, the direction of mirror plane is set to **Plane by From-To Vector**.

**! TIP** Shortcut keys for locking a plane are:

**Plane by From-To Vector** - CTRL+6,

**Plan Plane** - CTRL+1;

**Elevation plane: East- West** - CTRL+2

**Z Plane: X-axis** - CTRL+2;

**Elevation plane: North-South** - CTRL+3

**Z Plane: Y- axis** - CTRL+3.

5. Select a location for the **From Point**  position (or origin).
6. Select a location for the **To Point**  position (or destination).
7. On the **Parent or Related Object** dialog box, review the options, and adjust as needed.

**! TIP** You can select an option to keep the original permission groups.

8. Click **OK** on the dialog box, and then click **Finish** on the ribbon.

### NOTES

- You cannot use the **Mirror Copy** command on hangers and supports objects.
- To select objects for this command, you can use a filter, fence, or directly select the object within a space. If objects already are selected and you select the **Mirror Copy** command, the selected objects are the select set.
- If you set the destination mode to **Point to Mirror About** and the direction of the mirror plane to an option other than **Plane by From-To Vector**, the software does not require the **From Point** designation. The **To Point** command starts automatically.
- If errors occur, the software tracks these discrepancies and records them in the **View > To Do List**. Possible errors concern flow direction and listing of left- and right-handed parts. For example, if you mirrored a piping configuration and connected it to another object with a different flow direction, the software would report an error. Also, left- and right-handed parts must appear correctly on parts lists.
- Based on reference data settings (the option **Component must be replaced rather than mirroring, rotating, or copying** is in the mirror behavior select list), you can replace a part with another part listed in the part properties data. If the replacement part is not available for the active specification, the command continues with the original part rotated but not mirrored.

- Properties of the modified objects match the original objects with some exceptions. Standard revision and status properties are updated. The software updates named objects, based on the name rule (that is, the software **does not** update the named object if you defined the name rule, while the software **does** update the named object for system-defined name rules). The software automatically updates properties that track location or orientation.
- If you select the same point for the **Move From** position (or origin) and the **Move To** point, the software displays a message that prompts you to select a different **Move To** point. However, if you must specify only one point, you can complete the **Mirror Copy** command using the **Point to Mirror About** option in the **Destination** list and select a plane in the **Direction** list.

## Construct symmetrical connections

This procedure is available for the **Plan Plane**, **Elevation plane: East- West**, **Z Plane: fore-aft**, **Elevation plane: North- South**, and **Z Plane: port-stbd** options in the **Direction** list on the **Mirror Copy** ribbon. You cannot construct symmetrical connections for the **Plane by From-To Vector** option.

1. Click **Edit > Mirror Copy**.
2. Place a temporary coordinate system at a point in the model.
3. Select the plane to mirror about. (Do not select the plane constructed using the **From** and **To Vectors**).
4. Select the destination point as the point to mirror about.
5. Click the location you want in the model.
6. Click **Finish**.

### NOTES

- If errors occur, the software tracks these discrepancies and records them in the **View > To Do List**. Possible errors concern flow direction and listing of left- and right-handed parts. For example, if you mirrored a piping configuration and connected it to another object with a different flow direction, the software would report an error. Also, left- and right-handed parts must appear correctly on parts lists.
- Based on reference data settings (the option **Component must be replaced rather than mirroring, rotating, or copying** is in the mirror behavior select list), you can replace a part with another part listed in the part properties data. If the replacement part is not available for the active specification, the command continues with the original part rotated but not mirrored.

## Parent or Related Object Dialog Box

Specifies parents for the newly copied and about-to-be mirrored objects. For example, you can assign a parent system for a copied object. You can review the system hierarchy in the **Workspace Explorer** on the **System** tab at the right of the display.

This dialog box also provides information about the objects related to your selection for the **Mirror Copy** command. The related objects are listed on this dialog box even though you did not specifically click these objects. You can click each row, and the object highlights in the software. An example of related objects is the set of features associated with a pipe run.

### Description

Provides a description of the input object.

### Selection

Shows the parent associated with the object.

### Delete Optional

Removes the text in the **Selection** column for rows in the grid that start with the word "Optional." This button is useful in large copy-and-paste operations when the grid is filled with many optional tasks, and you want to remove all these items at once.

### Show Clipboard window

Creates a window that displays the Clipboard contents, including the input objects.

### Keep original permission groups

Controls the permission group assignment for the pasted objects. This option is helpful when you are pasting large data sets containing different types of objects (piping, equipment, structure). Here are some important points to remember about this option.

- When this option is selected, the software assigns all copied objects to the original permission group, as long as you have write access to that permission group.
- When this option is selected, if you do not have write access or if the permission group does not exist (such as in the case when mirroring and copying from one database to another), then the software assigns the objects to the active permission group.
- When this option is not selected, the software assigns the objects to the active permission group.
- When pasting from one database to another, permission groups are considered identical if they share the same name.

### Paste in place

This option is checked but not available to change in the Mirror and Copy workflow.

### See Also

*Mirror Copy* (on page 173)

## Update Names

Updates objects with name rules that are not automatically updated. You use this command when an object is moved to a different naming parent, causing a change in the relationship or hierarchy within the model.

For example, a pipeline is the naming parent for a weld. The name of the weld is the same as the pipeline it is in.

However, if the pipe run that holds the actual weld object in the system hierarchy is moved to a different pipeline. The weld name does not know to update because it does not know the change occurred.

You run **Edit > Update Names** to update the names automatically. The weld name updates to reflect the new pipeline to which it is associated.

## Update Names

1. Select objects that need to be updated.
2. Select **Edit > Update Names**.

*The selected objects are updated according to their name rules.*

## Properties

 Edits the properties of a selected object. If you select multiple objects, you can edit only the properties shared by the group.

You can edit the properties of a selected object from any task. The occurrence and definition properties of these objects are defined in the Catalog database and the specific values of these properties, such as relationships, are stored in the Model database. The **Properties** dialog box for each object type can be different, but most dialog boxes have the following in common:

- Grids with controls
- An **OK**, **Cancel**, and **Apply** button
- **Notes**, **Relationship**, and **Configuration** tabs

The grid controls typically display catalog-defined properties for the selected object. Most information in the grids is read-only, but you can modify information in the grid on the **Occurrence** tabs. While the **Properties** dialog box is open, you can select other objects in the workspace. When you select another object, the edit ribbon for that object appears, and the content of the **Properties** dialog box shows the values of the new selection.

### Selecting Multiple Objects of the Same Type

When you select multiple objects of the same type, the **Properties** dialog box appearance does not change. If the objects all have the same value, the **Value** column displays the value of the property. If one or more properties are different, the **Value** column is blank.

## Selecting Multiple Objects of Different Types

When you select multiple objects of different types, the **Properties** dialog box displays only those tabs that these objects have in common. You can only edit the properties associated with these tabs.

## Transferring Ownership

In a global workshare configuration, you can re-assign ownership of model objects from their current permission group to another satellite or host permission group using the **Transfer** button on the **Configuration** tab.

The following rules exist for this functionality:

- Only the location that currently owns the object can transfer its ownership of the object to another location. A location that does not have ownership of an object cannot directly take ownership of an object from another location.
- To transfer ownership from one location to another, you must have physical write permission on the current permission group and virtual write permission on the target permission group. Virtual permission means that if location were not a factor, you would have write access to that permission group. The host location must set up permissions for each of the satellite locations ahead of time.

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## What do you want to do?

- *Edit properties (on page 180)*
- *Transfer ownership of objects in the model (on page 181)*

---

## Edit Properties

1. Select one or more objects to edit.
2. Click **Edit > Properties**.
3. Select the tabs that contain the properties to edit.
4. Edit the properties as needed.
5. Click **Apply**.

### NOTES

- Different **Properties** dialog boxes appear for different objects.
- You can select multiple objects of the same type and change the properties as a group.
- If you select multiple objects of different types, only the tabs for the common properties appear on the **Properties** dialog box.
- Some properties require write access before you can edit them. For example, you can change the permission group listed in the **Permission Group** box on the **Configuration** tab only if you have write access to that permission group and to the permission group in which you plan to place the object.

## Transfer ownership of objects in the model

1. Select one or more objects in the model.
2. Click **Edit > Properties**.
3. On the **Configuration** tab, click **Transfer**.
4. On the **Transfer Ownership** dialog box, specify the new location and permission group.
5. Click **OK**, and click **Yes** on the confirmation message.

### NOTES

- You must have physical write permission to the permission group where the objects currently reside.
- You cannot undo the transfer of ownership.
- The other location receives the change when the database replication process for the objects takes place.

## Properties Dialog Box

Displays properties for review and editing. Some tabs are common across tasks, such as *Notes Tab* (on page 181), *Relationship Tab* (on page 182), and *Configuration Tab* (on page 151). Other tabs are specific to certain objects in the model.

The **Properties** dialog boxes display ToolTips when you pause the mouse over values in the grid. Some property values can be very long, and the ToolTips allow you to see the entire value. For example, one of the values for the **Mirror Behavior Option** property is "Component cannot be mirrored or rotated, but can be copied and translated".

### See Also

*Properties* (on page 179)

## Notes Tab

Creates and edits user-definable text placed by the designer on an object in the model. The notes provide special instructions related to the object for the fabricator and are available in downstream tasks. For example, the notes appear in two-dimensional drawings and within design review sessions.

 **NOTE** Only one note of a given kind from a given object can be shown on a drawing. For example, if there are two fabrication notes on a piping part, then only one of the notes shows on the drawing. It is important to know about and to consider this situation when defining notes on an object in the modeling phase. For example, you can display one Fabrication note and one Installation note by defining two separate labels for the two kinds of notes.

### Key point

Specifies the key point on the object to which you want to add a note.

### Notes at this location, listed by name

Lists all notes for the selected key point on the object.

**Date**

Displays the date that the note was created. The system automatically supplies the date.

**Time**

Displays the time that the note was created. The system automatically supplies the time.

**Purpose of note**

Specifies the purpose of the note.

**Author**

Displays the login name of the person who created the note. The system automatically supplies this information. You cannot change this information.

**Note text**

Defines the note text. The software does not limit the length of the note text.

**Show dimension**

Indicates that the note generates a dimension.

If you are displaying the properties for a Support component, then a dimension can be included for the component in the Support drawings, if you select the **Show dimension** option. The note must be associated with one of the key points for the Support component. It is recommended that you set the **Purpose of note** as **Fabrication**, but this is not a requirement. The note **Name** and **Note text** are not used when you select this option.

**New Note**

Creates a new note on the object.

**Standard Note**

Displays a list of standard notes from which you can select. This feature is not available in this version.

**Highlight Note**

Highlights the note in the graphic view so that you can easily find the note and the object to which it is related. This feature is not available in this version.

**Delete Note**

Deletes the currently displayed note.

## ***Relationship Tab***

Displays all objects related to the selected object for which you are viewing properties. For example, if you are viewing the properties of a pipe run, the related pipeline, features, parts, associated control points, hangers or supports, and equipment display on this tab. All WBS assignments, including project relationships, appear on this tab.

Additional examples for marine relationships are as follows:

- For plate and profile system properties, the related bounded objects, bounding objects, and connections are shown.
- For plate and profile system part properties, parent systems are shown.
- For assembly connection properties, all connected objects are shown.

- For the properties of a frame connection on a member, supported, supporting, and auxiliary supporting parts are shown.
- For split connection properties, the parent and auxiliary supporting parts are shown.

**Name**

Specifies the name of the object.

**Type**

Specifies the type of object. To change the options on the list, edit the **Weld Type** select list in Catalog.

**Go To**

Displays the properties of the selected object.

## **Configuration Tab**

Displays the creation, modification, and status information about an object.

 **NOTE** You cannot define the filters using the **Configuration** tab.

**Plant**

Displays the name of the model. You cannot change this value.

**Permission Group**

Specifies the permission group to which the object belongs. You can select another permission group, if needed. Permission groups are created in Project Management.

**Transfer**

Reassigns ownership of the selected model objects from their current permission group to another satellite or host permission group. This option is only available if the active model or project is replicated in a workshare configuration. The option is not available if all of the objects in the select set already belong to another location and are non-transferable. For more information, see *Transfer Ownership Dialog Box* in the *Common User's Guide*.

 **NOTE** The **Transfer** option does not apply to the filters and surface style rules.

**Approval State**

Specifies the current status of the selected object or filter. The display depends on your access level. You might be unable to change the status of the object. The list is defined by the ApprovalStatus codelist.

 **NOTE** You can only edit or manipulate an object with a status of **Working**.

**Status**

Specifies the location of the object in the workflow process. Changing this property sets the **Approval State**. The list is controlled by the ApprovalReason codelist in the ApprovalReason.xls file. You must bulkload this file. For more information, see *ApprovalReason* in the *Reference Data Guide*.

**Date Created**

Specifies the creation date of the object.

**Created by**

Specifies the name of the person who created the object.

**Date Last Modified**

Specifies the date when the object was last modified.

**Last Modified by**

Specifies the name of the person who last modified the object.

***Transfer Ownership Dialog Box***

Allows you to specify a new location and permission group for the selected model objects.

**Current location**

Displays the name of the location with which the current permission group is associated. All of the objects in the select set must belong to the same location.

**Current permission group**

Displays the name of the permission group with which the selected objects are currently associated. If all of the objects in the select set do not belong to the same permission group, this box appears blank.

**New location**

Specifies the name of the location to which you want to assign the objects. In a global workshare configuration, this box lists all the locations in which you have write access to one or more permission groups. The selection in this box filters the entries in the **New permission group** box.

**New permission group**

Specifies the new permission group to which to assign the selected objects. If you specify a value in the **New location** box, this list displays all permission groups to which you have write access in the selected location. If you do not specify a value in the **New location** box, this list includes all permission groups to which you have write access in all locations except the current location. This box is blank if you do not have write access to any permission groups at any locations other than the current one.

**NOTE** We strongly recommend that administrators follow naming convention rules that include the location as a prefix in the permission group name.

## Go to Hyperlink

Displays a file or a web page associated with an object in your model. This command opens the appropriate software for viewing the file or web page. For example, if the hyperlink is `file:///computer/folder/file.bmp`, this command launches the software your system associates with the .bmp file extension. If your computer does not have the necessary software to open the target file of the hyperlink, you are prompted to select an application in which to open it. If you select an object that does not have a hyperlink associated with it, the **Go to Hyperlink** command is not available.

You can use the **Insert > Hyperlink** command to create, edit, and unlink hyperlink addresses attached to objects in a workspace. Hyperlinks are stored in the Site database so that any user working with that object can access them.

## Follow a hyperlink

1. Select an object in your workspace.
2. Click **Edit > Go to Hyperlink**.

### NOTES

- The shortcut key for the **Hyperlink** command is CTRL+K.
- You can right-click an object to access the **Go to Hyperlink** command on the shortcut menu.

## SECTION 6

# View Menu

The **View** menu provides commands for clipping views, managing views, applying view styles, and displaying viewing tools. Some of the commands on this menu might change depending on the active task.

You can manipulate the windows and views in the software to affect the way you see the model. For example, you can compare a window to a camera. When you look through the camera lens, you see a real-world view of the objects in the database. You can change the view by zooming in and out, and focusing on different parts of the model. You can also zoom or pan views.

With the commands on the **Window** menu, you can create and arrange new windows that allow you to see more than one section of a model. You can minimize and maximize open windows in the software.

A view consists of the contents of a window in the software. Using the commands on the **View** menu, you can quickly manipulate the views of the model.

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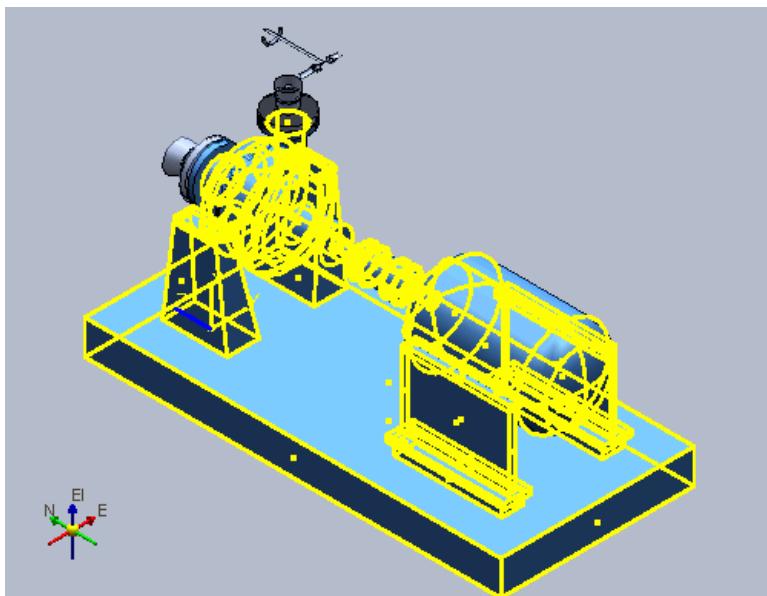
## Clip by Object

 Isolates an object or group of objects in your model for closer viewing or more detailed work. If you have already selected the objects when you click **Clip by Object** , the clipped objects immediately appear in the active view. The clipping planes are positioned according to the active coordinate system, rather than the global coordinate system. Objects connected to a rotated coordinate system are clipped according to the global coordinate system. To restore the view, click *Clear Clipping (on page 197)* .

Below is a selected pump before clipping.



After clipping, only object bounded by the selected objects, in this case the pump, display in the active view. You can click **Select View**  on the **Clip by Object** ribbon to apply the clipping to additional views.



## Clip by Object Ribbon

Provides options for clipping the active view by selected objects.



### Select Objects

Specifies the objects to clip such as pipes, equipment, duct, and so forth. The objects define the clipping boundaries. If you have already selected objects before selecting the **Clip by Object**  command, you can proceed by accepting the selected objects or add more objects to the select list.



### Select View

Selects and applies the clipping to windows other than your active window. The clipping boundary based on the selected objects is applied to each view you select.

### Reject

Clears the objects you select with the **Select Objects** command. Use this command when you want to start over. This button is not available when the **Select View** button is active.

### Accept

Hides all objects except the selected objects in the active view. This button is not available when the **Select View** button is active.

### Close

Displays the clipping in the active view, completes the **Clip by Object**  command, and returns you to the last command you used before you selected **Clip by Object** .

### Fit View

Controls whether to fit the view to the graphics when you run the **Clip by Object** command.

By default, the **Fit View** option is checked, and the command clips the view and fits the view to the graphics. If the option is off, the command only clips the view but does not fit the view to the graphics. A change to the option setting takes effect the next time you run the command.

 **NOTE** Objects connected to a rotated coordinate system will be clipped according to the global coordinate system.

## Clip by object

1. Click **View > Clip by Object**.
2. Click the object you want to clip.
3. Click **Accept ✓**.
4. Click **Close**.



Sets the view clipping volume. The software hides all objects not inside the clipped area. This command also lets you edit the clipped volume by dragging clipping planes in a graphic view.

There are two modes for using this command: **Clip by Volume** or **Clip by Plane**. If you choose **Clip by Volume**, you specify that volume by placing two area definition points (the cross section of the volume) and two depth points (the extent of the volume). If you choose **Clip by Plane**, you specify the near and far clipping planes.

### Clip by Volume or Plane Ribbon



#### Clip by Volume

Specifies that the command uses volume to limit the display. You specify this volume by placing two area definition points (the cross section of the volume) and two depth points (the extent of the volume). This is the default mode for this ribbon.



#### Clip by Plane

Specifies that the command uses near and far clipping planes to limit the display.



#### First Area Point

Specifies the first point of the volume. You can specify this point by using the **Tools > PinPoint** command or **QuickPick**.



#### Second Area Point

Defines a rectangular face of the clipping volume. You must specify this point in the same plane as the first area point. As you move the pointer to define this point, the software displays a rectangular outline shape to indicate the size of the face. You can specify this point by using **PinPoint** or **QuickPick**.

 **First Depth Point**

Specifies the initial point that defines the extent of the volume. You can specify this point by using **PinPoint** or **QuickPick**.

 **Second Depth Point**

Defines the second depth point to complete the clipping volume. You can specify this point in any view by using **PinPoint** or **QuickPick**.

 **Select View**

Defines additional windows for displaying the clipped volume. The selected volume appears in the active window. This step lets you select additional windows to display the volume.

 **Drag Clipping Planes**

Allows you to drag the clipping volume to define a new view. This step is optional. The software applies the new clipping volume to the active window when you release the volume edge.

**Finish**

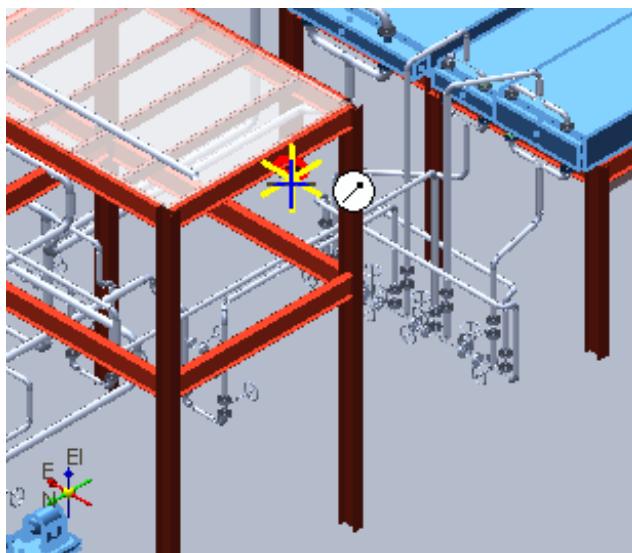
Displays the clipping in the active window and returns control to the last active command. For example, if you are routing pipe and want to clip some objects, you can click **Clip by Volume** , step through the command, then click **Finish**, and the software returns you to the **Route Pipe** command.

**Fit View**

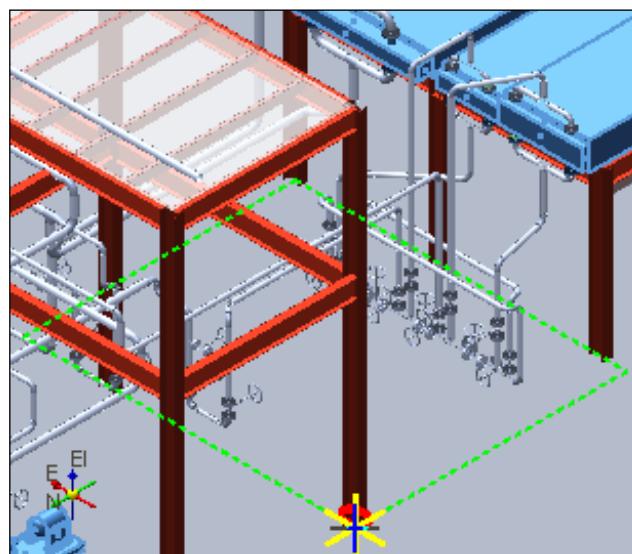
Controls whether to fit the view to the graphics when you run the **Clip by Volume** command. By default, the **Fit View** option is checked, and the command clips the view and fits the view to the graphics. If the option is off, the command only clips the view but does not fit the view to the graphics. A change to the option setting takes effect the next time you run the command.

## Clip by volume

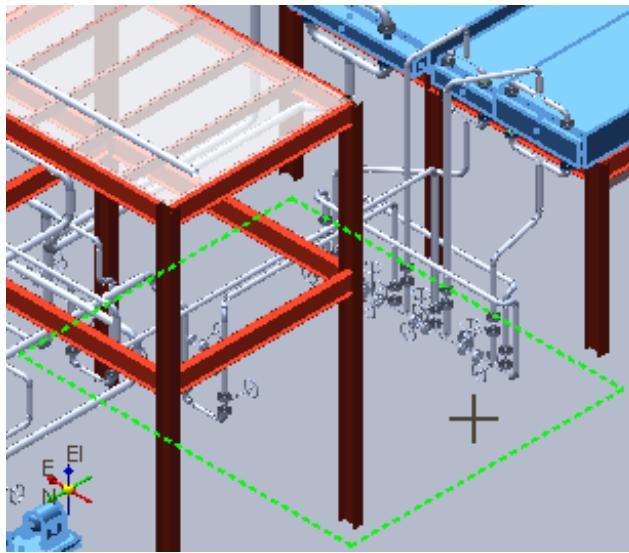
1. Click **View > Clip by Volume or Plane.** 
2. Click **Clip by Volume** .
3. Select the first area point in the view.



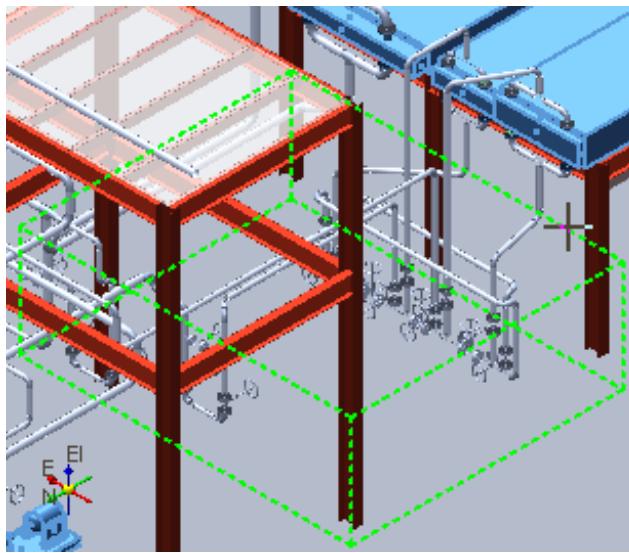
4. Select the second area point in the view.



5. Select the first depth point to define the extent of the volume. You can see depth points best in an isometric view.

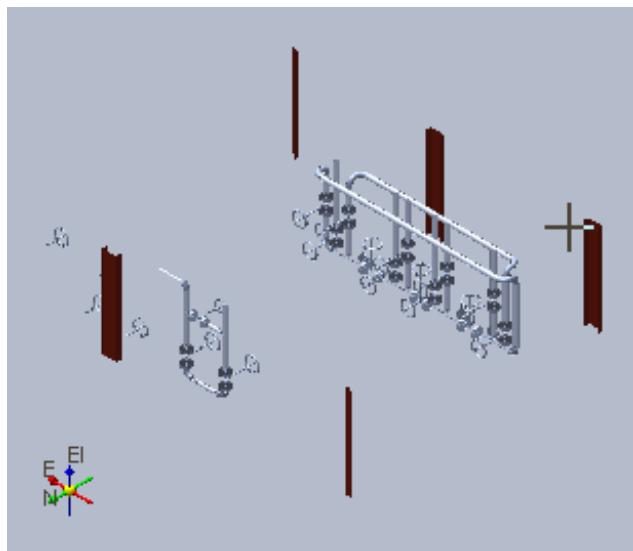


6. Select the second depth point to define the extent of the volume. You cannot clip objects to a zero depth.



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7. Select the window where to use the volume clipping.



8. Click **Finish**.

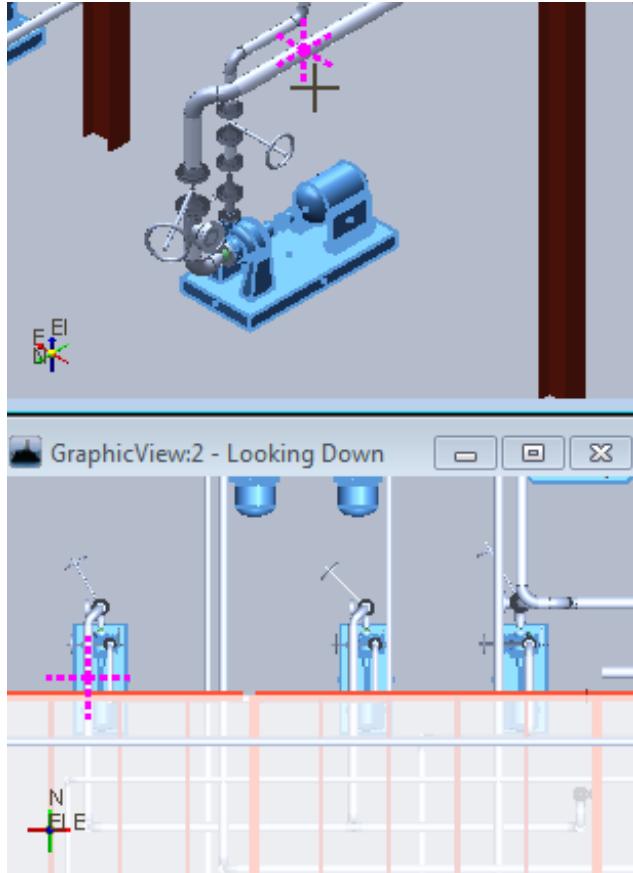
#### NOTES

- You can modify the view volume of all selected windows by dragging the clipping planes. The movement is normal to the plane. The software assigns the edited clipping volume to the active view and to all views selected after you start the command.
- To restore the view, click **Clear Clipping**.
- The clipping planes are positioned according to the active coordinate system, rather than the global coordinate system.

## Clip by plane

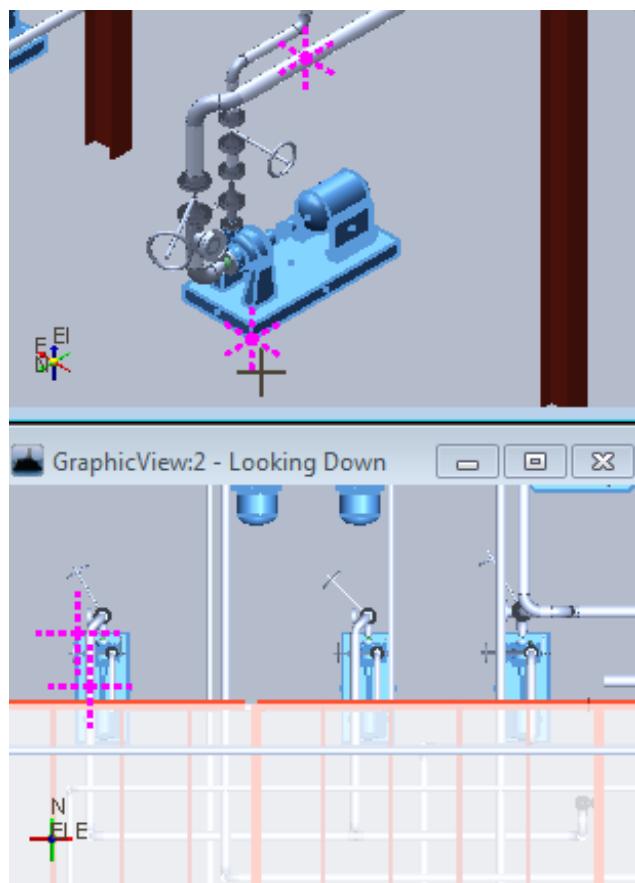
1. Click **View > Clip by Volume or Plane.** 
2. Click **Clip by Plane** .
3. Select the near point of the clipping plane in the view.

*The software displays a cross hair at the selected point.*



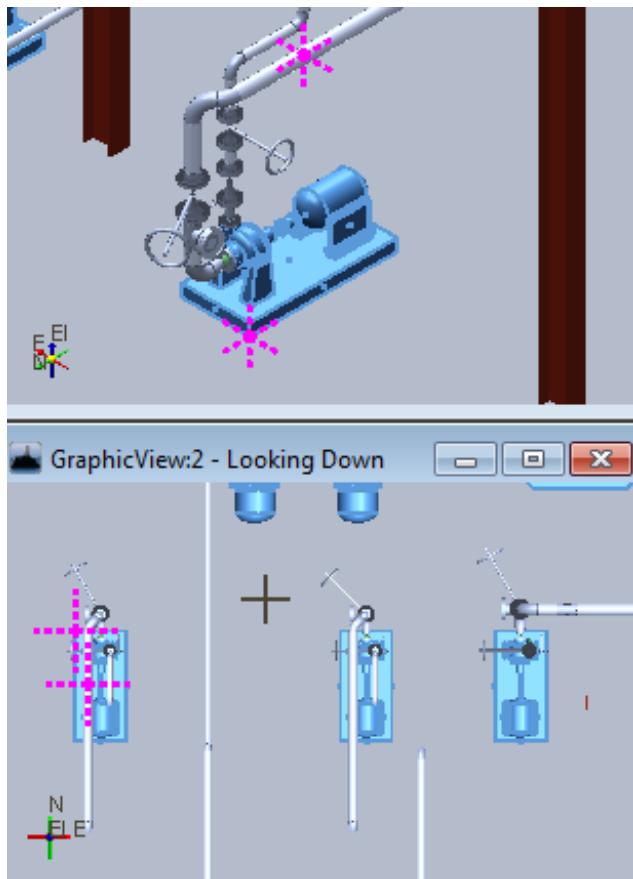
4. Select the far point of the clipping plane in the view.

The software displays a second cross hair at the selected point.



5. Select the view to apply the volume clipping.

**TIP** Clip by Plane  is useful only in orthographic views.



6. Click **Finish**.

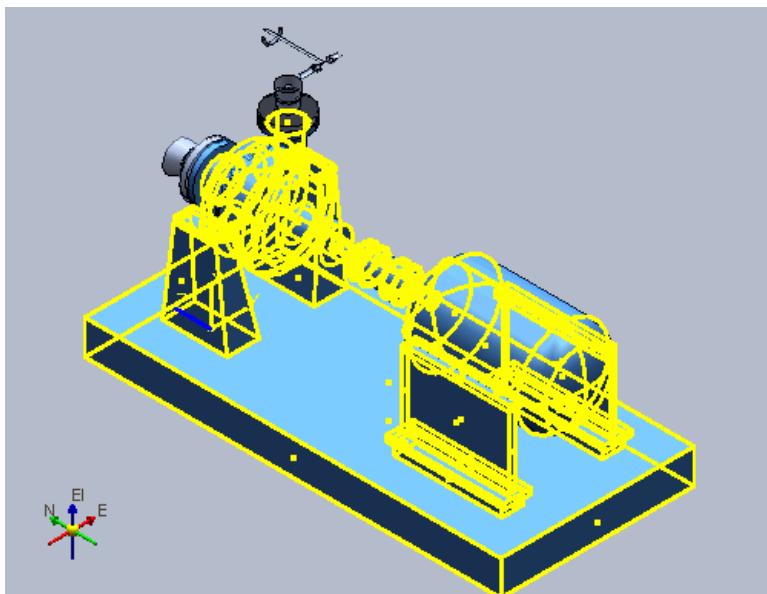
#### **NOTES**

- You can modify the view volume of all selected windows by dragging the clipping planes. The movement is normal to the plane. The software assigns the edited clipping volume to the active view and to all views selected after you start the command.
- To restore the view, click **Clear Clipping** .
- The clipping planes are positioned according to the active coordinate system, rather than the global coordinate system.

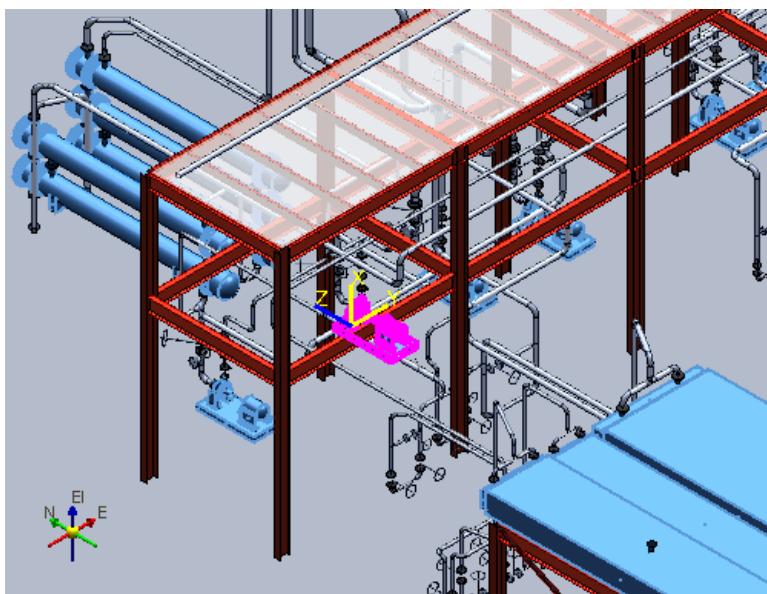
## Clear Clipping

 Restores the view to its original state by displaying any objects in the view that were hidden by the *Clip by Volume or Plane* (on page 189)  or **Clip by Object** commands. Use this command to restore the view before you define a new clipping volume or object.

Below shows a pump that was clipped using *Clip by Object* (on page 187). 



Below shows the same pump after using the **Clear Clipping** command.



## Active View Control

 Provides a separate graphic view and methods to control the camera/eye point position and the clipping of the active graphic view window. After you select the command, the **Active View Control** dialog box appears with the available options.

The **Active View Control** is an alternative to and supplements other view commands. It lets you see the settings of the graphic view window and adjust those settings. The dialog box provides a view of the camera/eye point position, the target/focus point position, and the clipping box of the active graphic view. Changes made in the **Active View Control** dialog box are reflected in the graphic view window.

## Manipulate the active view

1. Select a graphic view window.
2. Click **View > Active View Control**.

*The **Active View Control** dialog box opens.*

3. Use the commands on the ribbon to manipulate the dialog box view.

### NOTES

- **Top View** , **Side View** , and **Front View**  change the vantage point.
- The **Pan** , **Zoom Tool** , and **Zoom Area**  buttons allow you to move to another part of the view or enlarge certain parts of the model.

4. Drag the **Target / Focus Point**  in the dialog box view to change the camera angle and the clipping orientation in the active graphic view.
5. Drag clipping boundaries to change the clipping in the active graphic view.

## Active View Control Dialog Box

Provides a separate graphic view of the camera and clipping settings for the active graphic view. You can change the target (that is, the focus point) of the camera and the view clipping using the tools on this ribbon.

### Ribbon Commands

The following commands control display of objects in the **Active View Control** dialog box, but do not affect the active graphic view.

#### **Top View**

Displays objects in the dialog box from above. When selected, **Top** is displayed in the dialog box title.

#### **Side View**

Displays objects in the dialog box from the side. When selected, **Side** is displayed in the dialog box title.

 **Front View**

Displays objects in the dialog box from the front. When selected, **Front** is displayed in the dialog box title.

 **Pan**

Moves objects in the dialog box up, down, left, or right so you can see other areas of the model. The pointer appears as a hand when this command is active.

 **Zoom Tool**

Changes the display size of objects in the dialog box. The pointer appears as a magnifying glass when this command is active. Move the pointer up to zoom in, and down to zoom out.

 **Zoom Area**

Increases the display size of objects in the dialog box. Click and hold the left mouse button to drag a fence around an area. The dialog box view zooms in to that area.

 **Fit**

Fits all visible objects in the dialog box. The clipping box and the camera location are ignored.

 **Fit to Camera**

Fits all visible objects, the clipping box, and the camera location in the dialog box.

 **Always on Top**

Keeps the **Active View Control** window on top of all other windows.

 **Shade/Wireframe Mode**

Toggles object display in the dialog box between solid shaded objects and wireframe outlines of the objects. Wireframe is the default display.

 **Lock/Unlock Camera Target**

Locks or unlocks the camera location. When you unlock, you can move both the camera and the target point as you want.

## Graphic Icons

The following icons appear in the **Active View Control** dialog box and control display of the active graphic view.

 **Camera / Eye Point**

Position of the camera or eye point in the active graphic view. You usually do not move the camera.

 **Target / Focus Point**

Position of the target or focus point of the camera. The camera points to the target. You can drag the target around the dialog box to change the camera angle.

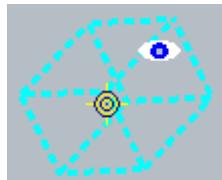
## Clipping

Shows the clipping boundaries in the active graphic view.

If the active graphic view is orthographic, then the clipping box is a rectangle:



If the active graphic view is isometric, then the clipping box is a cube:



You can drag the clipping boundaries to change clipping in the active graphic view.

 **NOTE** The clipping boundary orientation changes as you move the **Target / Focus Point**  


### See Also

*Active View Control* (on page 198)

## Previous View

Replaces the current view with the previous view, similar to the back command in your internet browser. Smart 3D remembers up to 10 previous or next views for every graphic window. This command can restore only view properties for scale and orientation. This command has no effect on display operations (such as the **Show** and **Hide** commands), styles, or other view properties. The shortcut key for **Previous View** is ALT+F5.

When 10 view modifications have been made, any subsequent view modifications result in the oldest view modification step being erased to make room for the newest modification.

When you use the **View > Named Views** command, you are recalling a saved view and applying it to the active window. This action differs from restoring a view using the **View > Previous View** command because the previous view does not have to be a saved view. If you exit a session file and then open it again, the previous view is unavailable unless it was saved.

When you use the **View > Navigate View** command, any view modifications that occur are captured as a single view modification step. For example, if you click **View > Previous View** after exiting the **Navigate View** command, the last view prior to the **Navigate View** changes is restored.

## Next View

Replaces the current view with the next view. This command is unavailable until you use **Previous View** at least once and works similarly to the forward command in your internet browser. Smart 3D remembers up to ten previous or next views for every graphic window. Next views are abandoned when a change is made to the view. For example, if you click **Previous View** four times, there are four Next views available until you edit the view. This edit erases all the saved Next views. This command can restore only view properties for scale and orientation. It has no effect on display operations (such as the **Show** and **Hide** commands), styles, or other view properties. The shortcut key for **Next View** is ALT+SHIFT+F5.

When ten view modification steps have been made, any subsequent view modifications result in the oldest view modification step being erased to make room for the newest step.

When you use the **View > Named Views** command, you are recalling a saved view and applying it to the active window. This action differs from restoring a view using the **View > Previous View** command because the previous view does not have to be a saved view. If you exit a session file and then open it again, the previous view is unavailable unless it was saved.

When you use the **View > Navigate View** command, any view modifications that occur are captured as a single view modification step. For example, if you click **View > Previous View** after exiting the **Navigate View** command, the last view prior to the **Navigate View** changes is restored.

## Named Views

 Assigns a name and description to a view so you can apply the settings later to the active window. A saved view contains all view information required to restore the view volume, eye point, and target point. However, a saved view does not define the perspective angle of the view or its rendering characteristics. Additionally, if you want to rename a view, change the description, delete the view, or even change the settings that make up a view, those tasks can be accomplished from the *Named Views Dialog Box* (on page 202).

Default views include **Top**, **Front**, **Right**, and **Isometric**. You can access these views by clicking the down arrow beside the **Named Views** button on the main toolbar.

---

### What do you want to do?

- *Save a view* (on page 202)
- *Edit a saved view* (on page 202)
- *Recall a saved view* (on page 202)
- *Delete a saved view* (on page 202)

---

## Save a view

1. Click a view to make it active.
2. Click **View > Named Views**.
3. In the blank line indicated by an asterisk, type a name and description for the saved view.

### NOTES

- Named views are useful for resetting the view after you have used other commands to change the way you see the area. For example, if you change the angle from which you are viewing an area, or change the magnification to see a particular object more clearly, you can then select a named view to quickly return to a standard set of view settings without changing each setting one at a time.

## Edit a saved view

1. Click **View > Named Views**.
2. To edit the name or description of the view, type the change in the appropriate row.
3. To replace the content of a named view with the view in the current window, select a saved view, and click **Redefine**.

## Recall a saved view

1. Click any view.
2. Click **View > Named Views**.
3. Click a saved view to recall.
4. Click **Apply**.

## Delete a saved view

1. Click **View > Named Views**.
2. Click a saved view to delete.
3. Click **Delete** .

## Named Views Dialog Box

Adds, edits, or deletes saved views, or applies saved views to an active window.

### Name

Specifies the name of the view in this column. You can edit this name later by clicking this cell.

### Description

Specifies a description of the view in this column. You can edit this name later by clicking this cell.

### Redefine

Overrides the settings of the selected view with the settings of the active view. When you click this button, a confirmation dialog box informs you that you are about to delete the saved view and replace it with new settings.

#### Delete

Removes the selected view from the list and the database.

**WARNING** After you have deleted a named view, you have to redefine it. The **Undo** command cannot be used to undo the delete operation.

#### See Also

[Named Views \(on page 201\)](#)

## Common Views

 Displays a two-dimensional or isometric orientation of objects in the active view. The command opens the **Views** dialog box, which displays a three-dimensional outline box. This box consists of white circles on each corner and three white arrows that point to the faces. Each corner circle, arrow, or face of the box highlights in yellow as you pause the pointer over it. You can select one of the six faces of the 3D box to change your view to a 2D view, or you can select one of the eight corner circles to change your view to an isometric view. A message at the bottom of the dialog box indicates the direction or type of your selection, such as **Plan**, **Isometric**, and so forth.

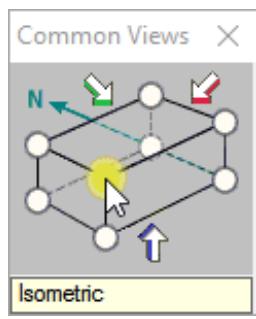
### Select a standard isometric or orthographic view

1. Select the view that you want to modify.
2. Click **View > Common Views**.
3. To select an isometric view, click one of the eight circles.
4. To select an orthographic view, click a white arrow or one of the six sides of the box.

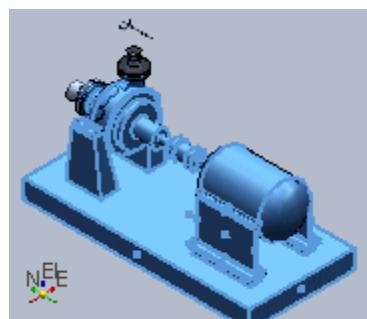
 **NOTE** You can also access this command by clicking **Common Views**  on the main toolbar.

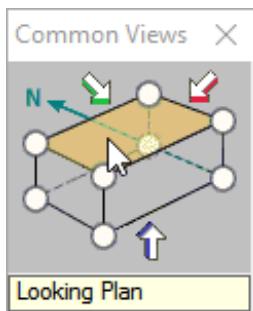
## Common Views Dialog Box

Provides a graphical display used to select the angle from which you view the workspace. Select a face of the displayed box to view the area two-dimensionally from the specified side, or select a corner of the box to open an isometric view of the area.

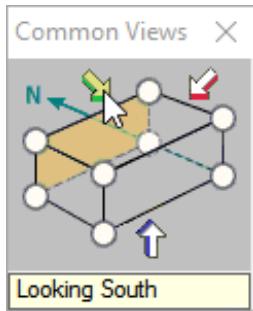
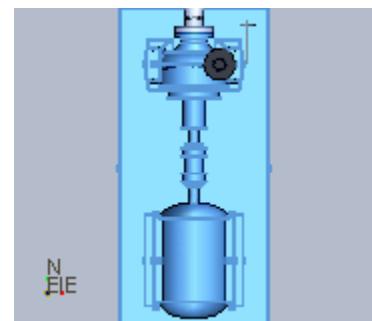


Click one of the eight corner circles to change your view to an isometric view.

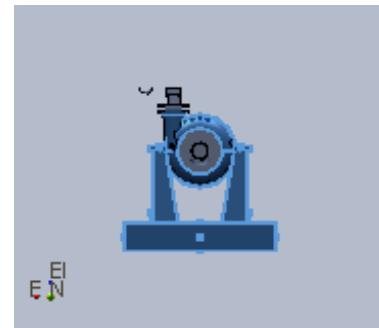




Click one of the six faces of the 3D box to change your view to a 2D view.



Click one of the three white arrows that point to a face to see that view.



The text at the bottom of the **Common Views** dialog box provides a description of the view that you select.

## View by Points

 Provides options for specifying the view plane by three points or along a line. When you select **View > View by Points**, a ribbon with two options appears.

### **View by 3 Points**

Creates a plane based on three points you choose. This plane is parallel to the view plane, which can be thought of as the computer screen. This is the default option.

### **View along Line**

Creates a vector based on two points (a From point and a To point). This vector is perpendicular or normal to the view plane.

---

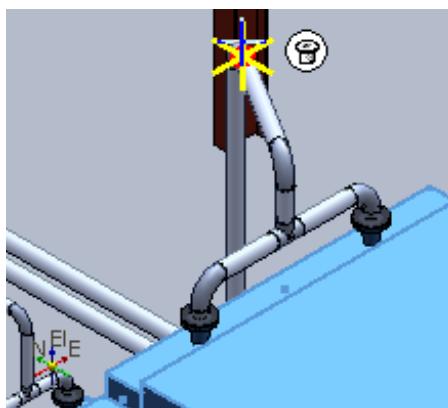
### What do you want to do?

- *Adjust a view by points* (on page 205)
- *Adjust a view along a line* (on page 206)

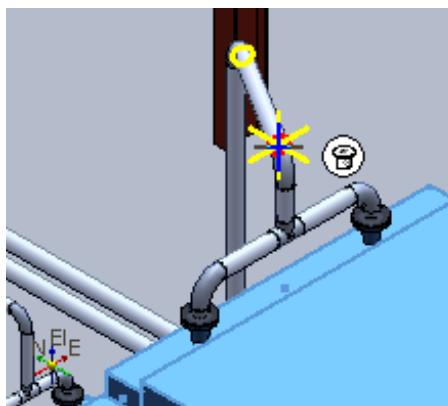
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## Adjust a view by points

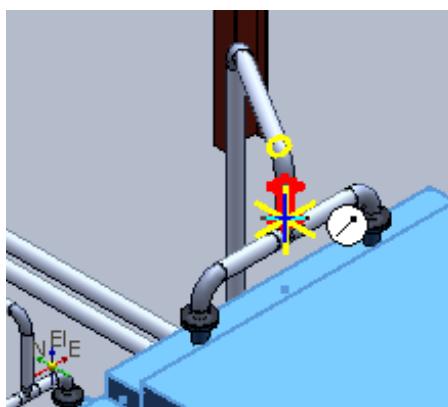
1. Click **View > View by Points.** 
2. Click **View by 3 Points**  if it is not already selected.
3. Click to designate point 1.



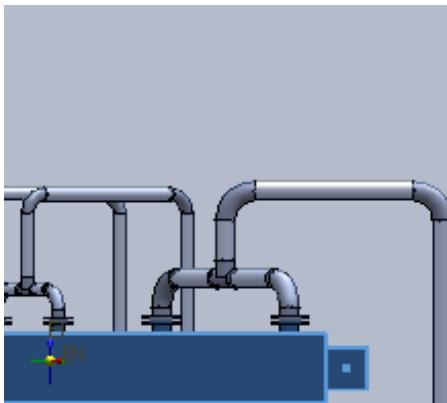
4. Click to designate point 2. Points 1 and 2 form a vector in the view plane.



5. Click to designate point 3.

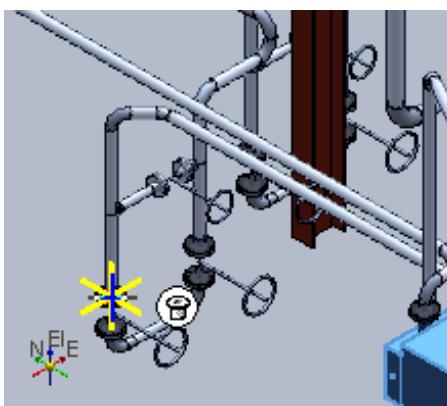


The three points form a plane that is parallel to the view plane.

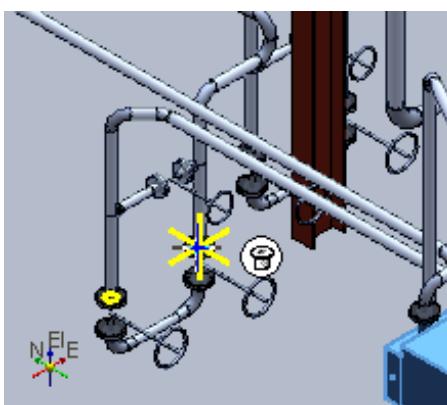


## Adjust a view along a line

1. Click **View > View by Points.** 
2. Click **View along Line**  on the ribbon if it is not already selected.
3. Click to designate point 1. This point is the From point.

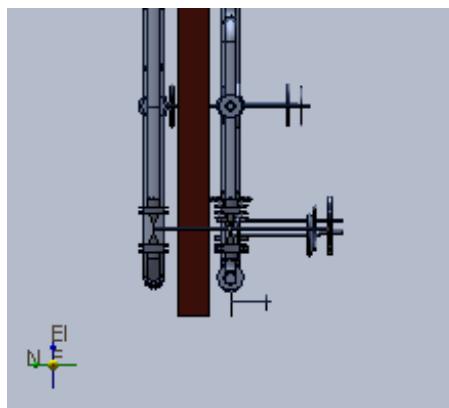


4. Click to designate point 2. This point is the To point, and it forms a vector with point 1.



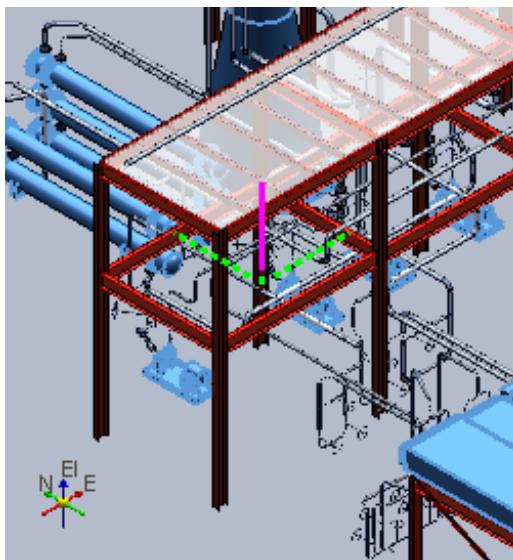
After you place point 2, the software adjusts your line of sight into the model to go through

the two points you placed.



## Rotate View

Rotates or turns a view freely about a point or about an axis parallel to one of the axes in the global coordinate system. Unlike *Common Views* (on page 203) that only allows you to rotate a view by a predefined set of points, this command allows you to rotate the view in any direction. The rotation graphic is shown as a dashed green triad in the view with the selected rotation axis in red (the default highlight color).



### Angle

Specifies the degrees about the selected axis to rotate the view. Type the value in the box, and press ENTER. When you rotate a view with the mouse, you can use the **Angle** box to monitor the current angle of rotation. Positive rotation is clockwise, and negative rotation is counter-clockwise.

### Locate Objects

Locates the graphic objects in the view. When **Locate Objects** is **ON**, the view rotates around a selected object. When **Locate Objects** is **OFF**, the view rotates around the

selected axis line.

#### **Move Point of Rotation**

Allows you to select a point or a line of rotation. Click **Move Point of Rotation**, and then select any point or line in the view about which to rotate.

#### **Close**

Closes the **Rotate View** command and the ribbon. If another command was active when you clicked **Rotate View**, that command resumes.

You can rotate a view at any time, even when you are using another command.

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### **What do you want to do?**

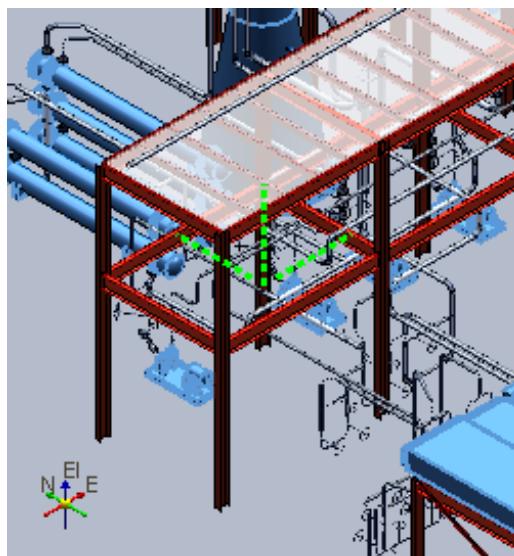
- *Rotate a view around an axis* (on page 208)
- *Rotate a view around a new center point* (on page 210)
- *Rotate a view around a linear object* (on page 211)

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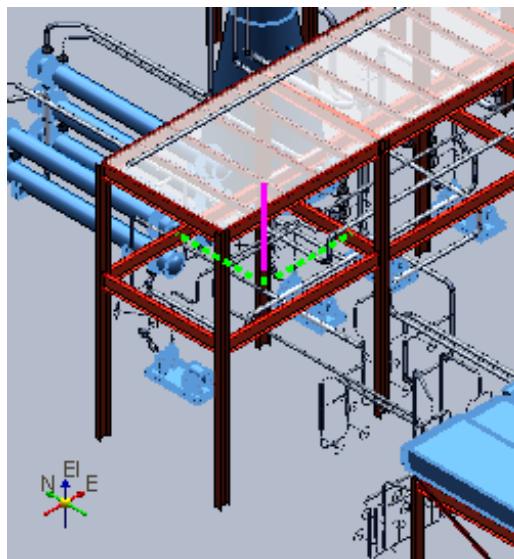
## **Rotate a view around an axis**

1. Click **View > Rotate View**.

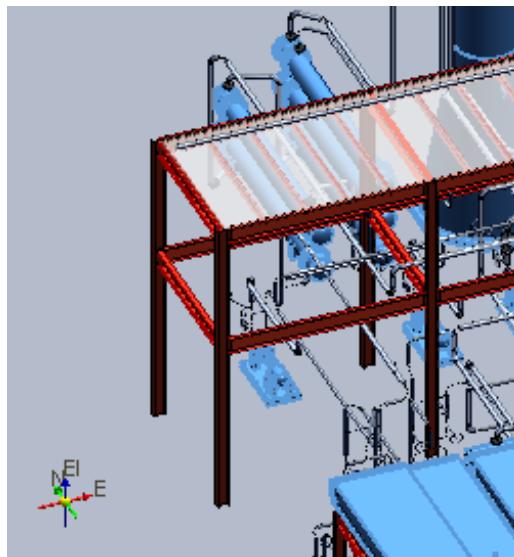
*The rotation graphic appears at the view origin.*



2. Define a focus of rotation by pausing the pointer over one of the axes on the rotation graphic to highlight and accept it as shown in the graphic.



3. Drag the selected focus of rotation to rotate the view.



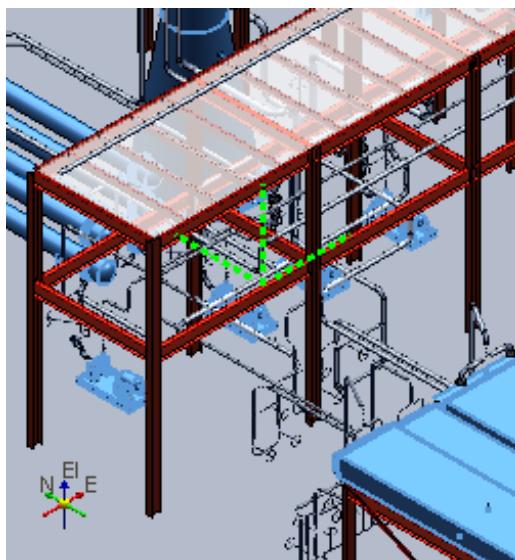
4. If you want a specific degree of rotation, type a value in the **Angle** box on the **Rotate** ribbon, and press ENTER.
5. Right-click to end the command, or click **Close** on the ribbon.

**NOTE** When you end the **Rotate View**  command, the previous command and its ribbon, if any, resumes.

## Rotate a view around a new center point

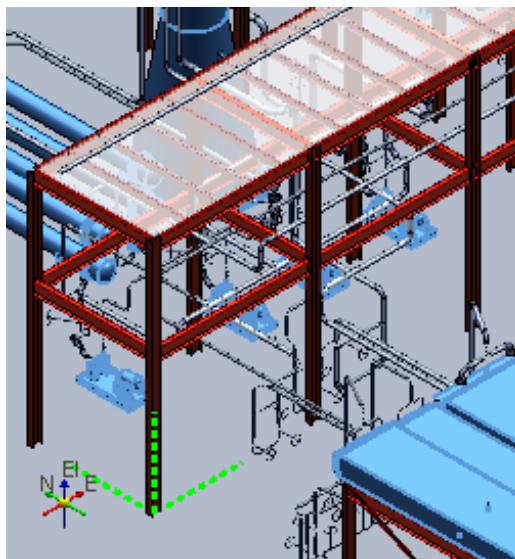
1. Click **View > Rotate View**.

*The rotation graphic appears at the view origin.*



2. Click **Move Point of Rotation**

3. Drag the origin point of the rotation graphic to define the new origin point.



4. Drag over the axes of the rotation graphic to rotate the view about the new center point.

**NOTE** When you end the **Rotate View** command, the previous command and its ribbon, if any, resumes.

## Rotate a view around a linear object

1. Click **View > Rotate View**.

*The rotation graphic appears at the view origin.*



2. Select a linear object in the model and drag your cursor to start the rotation.

**TIP** The linear object that you rotate around can be a pipe run, duct run, or cableway run, or a grid line or structural member, for example.



3. If you want a specific degree of rotation, type a value in the **Angle** box on the **Rotate** ribbon, and press **ENTER**.
4. Right-click to end the command, or click **Close** on the ribbon.

 **NOTE** When you end the **Rotate View**  command, the previous command and its ribbon, if any, resumes.

## Look at Surface

Defines a view of any surface in the model. When you select a surface or reference plane, the selected surface appears in the front and is displayed as two-dimensional. The E-axis (X-axis) and N-axis (Y-axis) maintain an orientation that is related to the active coordinate system. This command allows you to bring a selected surface to the front.

## Zoom Tool

 Increases or decreases the display size of objects in the model. You can zoom in to get a closer view of an object or zoom out to see more of the model at a reduced size. You can use the mouse scroll wheel to zoom in and out and to pan at any time without having to select this command. The shortcut key for this command is CTRL+SHIFT+Z. Click **View > Previous View** (ALT+F5) to undo a zoom or pan.

When you do this while Zoom Tool is active:	The view does this:
Left-click twice to fence an area	Zooms area
Left-drag	Zooms in or out dynamically
CTRL + Rotate Scroll Wheel	Pans up and down
CTRL + SHIFT + Rotate Scroll Wheel	Pans left and right
Rotate Scroll Wheel forward or backward	Zooms in or out at the current pointer location

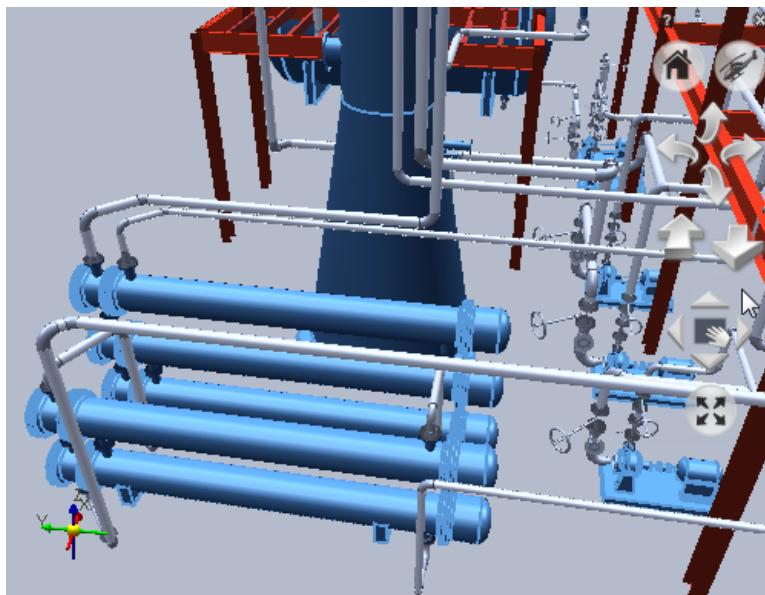
## Navigate View

 Starts 3D navigation in the active window. Smart 3D provides several ways to navigate through your 3D model data so that you can pick a scheme that is most comfortable or familiar to you. There is a **fly mode** navigation that provides a fluid, multi-directional motion for moving and looking around the model.

### ■ NOTES

- When you enter 3D navigation, the current model view (defined in the **Format View** settings) automatically changes to a **Perspective** projection mode with a **Smooth Shaded** render mode. The current aspect setting does not change. For 3D navigation, a perspective view shows the three dimensions of an object and provides a more real-life representation of objects because it conveys depth. The further the object surface is from the eye, the smaller it appears in the view. When you exit 3D navigation, the view switches back to the original **Format View** settings.

- The camera focal point is determined by the view depth of the object closest to the screen center point when entering or exiting 3D navigation. The focal point of 3D navigation is the center point of the display window. When you enter and exit 3D navigation and the view transitions to and from perspective projection mode, the center focal point stays in the same location. However, objects that were not at the center of the window could display closer or further away. To make the projection mode transitions appear smoother, you can modify the view so the object of interest is at or near the center focal point when entering and/or exiting 3D navigation.
- When you use 3D navigation, the **Next View** and **Previous View** commands do not record the view changes. The **Next View** and **Previous View** commands only remember the state of the view before and after the 3D navigation changes.
- You can enable 3D navigation in each window you have open. After you click **Navigate View**, the **3D Navigator** displays in the active window. When you click on another window with 3D navigation still enabled, the 3D Navigator moves from the previous window to the currently-selected window.



The **Navigate View** command always sets the current tilt angle to **0** when it is enabled. The system does not restore the previous tilt angle when 3D navigation is turned off. To get back to the rotated view you were using before entering 3D navigation, select **View > Previous View**.

## 3D Navigation Controls

Select navigation controls that are most comfortable or familiar to you. To access navigation-specific help at any time, press **Q** or click **Help**  in the **3D Navigator**. To access additional product help, press **F1** or go to the **Help** menu.

### *Use the 3D Navigator (on page 220)*

#### Use Keyboard Controls

Arrow keys as well as the gaming standard **W** (Move In), **A** (Left), **S** (Move Out) and **D** (Right) are supported.



## Use Mouse Controls (Fly Mode)

Press **F** to enable Fly mode. You have the option to use only your mouse for navigation or to use keyboard + mouse combinations.



## Application-Specific Information

The 3D Navigator component is integrated into the following Intergraph Process, Power & Marine applications:

- Intergraph Smart™ 3D
- SmartPlant Review
- SmartPlant Construction
- SmartPlant Markup Plus

Any information or behavior that is specific to an application is noted. If your application is not listed, then there is no additional information.

### NOTES

- See *Graphics Card Information* (on page 225) for the basic requirements needed for 3D navigation.
- You can press and hold the **3D Navigator Look** and **Move** controls for continuous motion.
- Press and hold the center **Move** control  to drag the **3D Navigator** to a different location on/off the view window.

## Use Keyboard-Only 3D Navigation

You can use the keys below for 3D navigation. The keyboard can be used at all times to move through the model data set.

**TIP** The use of WASD keys offers an ergonomic solution when used in conjunction with a right-handed mouse.

To...	Use...
Open quick-help to get information on 3D navigation controls	Q
Move in	W
Move Left	A
Move out	S
Move right	D
Move up	E
Move down	C

**TIP** To move or walk through your model in a first-person perspective. Press and hold the designated direction key. Move left and right is a sidestepping motion.

To...	Use...
Move forward and left.	W + A
Move forward and right	W + D
Move backward and left	S + A
Move backward and right	S + D

**TIP** Walk at various angles through your model. Hold down the needed two direction keys simultaneously.

To...	Use...
Look up	I
Look left	J
Look down	K
Look right	L

**TIP** Look around the model as if you were turning your head. Simply move the mouse up/down, left/right from the crosshair point.

To...	Use...
<b>Return to the default, isometric home view of your model</b>	H
<b>Create your own custom home view</b>	CTRL+H
<b>Reset a customized home view back to the original default home view</b>	CTRL+SHIFT+H

**TIP** Press the H key if you are 'lost' in the model or need to return to the default model view.

## Use Mouse Only or Mouse + Keyboard Combinations (Fly Mode)

Fly mode offers a fluid, first-person movement in any direction within your model. In Fly mode operation, use your mouse to look around as well as work in conjunction with your keyboard for motion in all directions. You change the viewing direction with the mouse and move around with the keyboard.

By using mouse-only or mouse + keyboard controls, you can:

- Look 360 degrees around from a stationary point.
- Travel through your model and move up/down stairs and ramps
- Move sideways in a sidestepping motion.
- Move up and down to change your elevation.

**TIP** When you are in Fly mode, your cursor changes to a crosshair that is located at the center of your view window. When you exit Fly mode, the cursor changes back to its original pointer.

### Application-Specific Information

#### Smart 3D Fly Mode Information

- When you exit Fly mode, right-click or press **ESC** twice to exit 3D navigation.

#### SmartPlant Construction Fly Mode Information

- To encircle or rotate around a selected object, use the SmartPlant Construction **Encircle Model** command in the **Toolbox**. In SmartPlant Construction, you will not be able to use the left-mouse drag operation to encircle objects.

**Fly mode actions:**

To...	Use...
<b>Open quick-help to get information on 3D navigation</b>	Q
<b>Enter/Exit Fly mode</b>	F (Toggle to enter/exit)
<b>Exit fly mode, cancel all fly mode operations</b>	F again (Toggle on/off), ESC or right-click
<b>Turn on/off crosshair</b>	X (Toggle on/off)

Enter and exit fly mode to use mouse and keyboard combination navigation controls.

To...	Use...
<b>Move in</b>	Mouse Wheel Forward -or- W
<b>Move in (factor of 2)</b>	Middle Mouse Button/Wheel Click
<b>Move left</b>	A
<b>Move out</b>	Mouse Wheel Backward -or- S
<b>Move out (factor of 2)</b>	SHIFT + Middle Mouse Button/Wheel Click
<b>Move right</b>	D
<b>Move up</b>	E
<b>Move down</b>	C

- Walk through your model in the direction of the crosshair. Roll the middle mouse wheel forward and back, or press and hold the designated WASD key. A left or right move is a sidestepping motion.
- A middle mouse click moves you halfway in to your target point. Use SHIFT + middle mouse click to move back out the distance of the eye point from the target. The perspective angle does not change.

To...	Use...
<b>Move in and left.</b>	W + A -or- Mouse Wheel Forward + A
<b>Move in and right</b>	W + D -or- Mouse Wheel Forward + D
<b>Move out and left</b>	S + A -or- Mouse Wheel Backward + A

To...	Use...
<b>Move out and right</b>	S + D -or- Mouse Wheel Backward + D
<b>Move left/right/up/down</b>	Middle Mouse Drag

- Walk at various angles through your model. Roll the mouse wheel forward and backward while holding down the designated direction key. Or, hold down the needed two direction keys simultaneously.
- TIP** In a key combination move, if you release one directional key, you still continue moving in the direction of the other key.
- Press and hold the middle mouse button to side-step left or right. This enables you to move the model without changing the direction in which you are looking.

To...	Use...
<b>Look up</b>	I -or- Mouse Move Forward
<b>Look left</b>	J -or- Mouse Move Left
<b>Look down</b>	K -or- Mouse Move Backward
<b>Look right</b>	L -or- Mouse Move Right

Look around the model as if you were turning your head. Simply move the mouse up/down, left/right from the crosshair point.

To...	Use...
<b>Return to the default view of your model</b>	H
<b>Create your own custom home view</b>	CTRL+H
<b>Reset a customized home view back to the original default home view</b>	CTRL+SHIFT+H

Press the H key if you are 'lost' in the model or need to get back to a known view.

To...	Use...
<b>Encircle or rotate around an object</b>	Left mouse - press and hold

When rotating around an object, the encircle point is the current center point; not the center of the selected object.

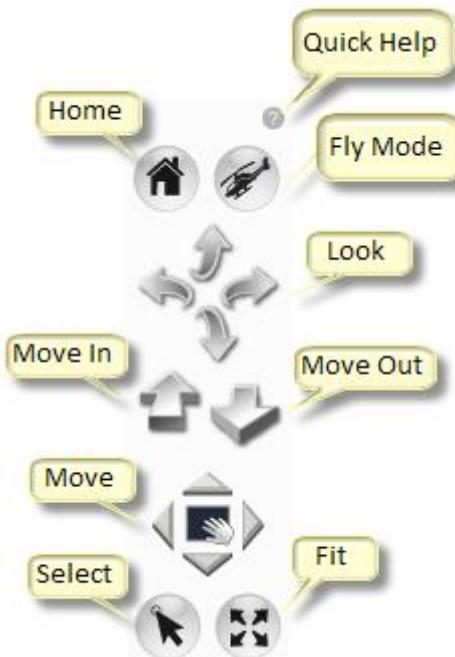
## Use the 3D Navigator

The **3D Navigator** tool supports the common navigation movements you can perform with the mouse and keyboard, such as look and move.

### Application-Specific Information

#### Smart 3D Navigator Information

- To start 3D navigation in Smart 3D applications, press CTRL+SHIFT+F, or click **Navigate View**  on the main toolbar.
- **Select**  on the **3D Navigator** is not available. To select an object, navigate to the required location in your model and click **Navigate View** to disable the 3D Navigator. Click **Select** on the Smart 3D toolbar to select objects. Use Smart 3D commands to perform required operations.
- When you right-click to end fly mode, right-click again to exit 3D navigation.
- The **Close** button on the 3D Navigator removes it from the display. You can still use the keyboard for navigation.



The **3D Navigator** supports the look and move actions you can perform with the mouse and keyboard. Once you move your cursor off of the **3D Navigator**, it fades into a transparent shadow.

Use the **Home** control if you are lost within the model and you want to return to the opening model view.

The **Fly Mode** control disables the **3D Navigator**. Use your mouse and keyboard controls for navigation.

The **Move In/Out** controls walk you closer or further away from your target point.

Use **Select** to pick an object in the model.

Selecting **Fit** automatically takes you to a fitted view of the selected objects in the view, if any. If no objects are selected, **Fit** takes you to a fitted view of the active clip volume. If there is no active clip volume, **Fit** takes you to a fitted view of the entire model.

### 3D Navigator Controls

- **Quick Help** - Displays help specific to 3D navigation.
- **Home (Default View)** - Returns to the startup view of the model. You can also create your own home view.

- **Fly Mode** - Enters Fly mode where you use the mouse and/or keyboard to interactively move and look through the model. When you are in Fly mode, the **3D Navigator** does not display, and your cursor changes to a crosshair located at the center of your view. You can press **F** or **ESC** to exit Fly mode. The **3D Navigator** then displays at its last position.
- **Look** - Changes your view direction as if you were turning your head. You can look around in all directions.
- **Move In/Out** - Takes you closer to or further away from model objects.
- **Move (Up/Down/Left/Right)** - Changes your position in the model at the crosshair cursor level as if you are 'walking' around in the model. You can move in any direction.
- **Fit** - Places all visible elements in the view window if no objects are currently selected. If any objects are selected, the control zooms to the selected objects.
- **Select** - Turns Select mode on and off (not available in the Smart 3D applications).

After you move your cursor off of the **3D Navigator**, it fades into a transparent shadow so that it does not distract from the current view. The **3D Navigator** reappears when you move the cursor back over it. You can select and move the **3D Navigator** to place it wherever you want in or out of your view window. To use the **3D Navigator**, just click on the needed action. A single click causes short movements while a click + hold action on the look and move controls enables you to move continuously.

While you are using **3D Navigator** controls, you can use the following mouse operations:

- Mouse wheel forward/backward
- Middle-mouse drag to move sideways and up/down in the model.

You can also use the keyboard in conjunction with the **3D Navigator** to move in one direction while looking in another. This can simulate walking through the plant as you are looking on either side.

#### • TIPS

- The **3D Navigator** controls are synchronized with the mouse and keyboard movements to display the current move or look action. For example, if you are pressing **W** to move in, the **Move In** button in the **3D Navigator** is highlighted.
- When you are in Fly mode, the **3D Navigator** does not display.

## **Return to Default View**

Click the **Default View** or **Home** control  at any time to return to the default top-right isometric view of your model.

## Enter Fly Mode

You can start Fly mode from the **3D Navigator** by clicking the **Fly Mode** control .

### Application-Specific Information

#### Smart 3D Fly Mode Information

- When you exit Fly mode, right-click or press **ESC** twice to exit 3D navigation.
- **TIP** You can also press the **F** key to start fly mode.
- After you enter Fly mode, the **3D Navigator** no longer displays. Use your mouse and keyboard to move around through the model.
- To exit Fly mode, right-click, press **F** again or press **ESC**. The cursor changes back to its original icon and the **3D Navigator** displays.
- In Fly mode, your cursor changes to a crosshair that is located at the center of your view window.

## Look Around

Press and hold any of the four **Look** controls to continuously look or turn in that direction as if you were turning your head. Use the **Look** control in the **3D Navigator** to look around from your current position in the model.



## Move

Move vs. Zoom: a Move operation changes the eye point as you get closer or further from the target. A Zoom operation is a perspective angle change.

- Use the **Move** controls in the **3D Navigator** to walk smoothly in left/right/up/down directions.
- Use **Move In/Out** controls to get closer to or further away from model objects. The perspective angle does not change during a move operation.



#### **TIPS**

- Press and hold any of the **Move** controls to continuously move in that direction.
- As you move through the model, the closer you get to your target, the slower the movement rate becomes. The further away from the target, the faster the movement rate.
- The Move operations enable you to move through solid objects such as walls, doors and slabs.

## **Fit to Object(s)**

The **Fit** tool places all visible objects in the active view if no objects are currently selected. If any objects are selected, the command zooms to the selected elements. Because the display is adjusted independently of the current view orientation, the objects in that display area are not clipped when performing rotate operations.

 **NOTE** In addition, the **Fit** tool zooms or fits to any objects that were selected *before* running 3D navigation.

### **Application-Specific Information**

#### **SmartPlant Review Fit Behavior**

In SmartPlant Review, the Navigator **Fit** command is a conditional fit. It performs a fit based on the objects that are selected.

- Fits to the selected object.
- Fits to selected item(s) in the SmartPlant Review Project Manager.
- Fits to the whole model and any visible objects.

1. Select one or more objects in the current view.
2. Click **Fit**  on the **3D Navigator**.

*The system flies to the selected objects.*

#### **TIPS**

- If no objects are selected, the system fits all objects into the current view.
- You can also perform a SHIFT + Fit operation that enables you to view the entire selected object within the current window size. Any rotation operations later performed in that view do not clip the selected object.

3. When you perform a Fit operation, you can continue selecting other objects as well as moving from the fitted location.

## **3D Navigation Tips**

### **Motion Tips**

- As you move through the model, the closer you get to your target, the slower the movement rate becomes. The further away from the target, the faster the movement rate.
- The **Move** operations enable you to move through solid objects such as walls, doors and slabs.
- Press ESC to end a navigation operation.
- To make small left/right/up/down movements, click and hold the middle mouse button as you move in the needed direction. It can sometimes be difficult to make small movements with the mouse and keyboard because the distance of motion for each key press is greater than what is needed. This is especially true when you are close to objects within the 3D model.

## Application-Specific Information

### Smart 3D Navigation Tips

The **Navigate View** command always sets the current tilt angle to **0** when it is enabled. The system does not restore the previous tilt angle when 3D navigation is turned off. To get back to the rotated view you were using before entering 3D navigation, select **View** menu > **Previous View**.

### Fine Tuning/Customization

- You can change the **Repeat Delay** and **Repeat Rate** keyboard settings to fine-tune your keyboard motion during navigation. For more information, refer to your operating system's documentation on setting keyboard properties.

### Messages

**The color scheme has been changed to [Windows 7]. A running program isn't compatible with certain visual elements of windows.**

- **Meaning:** This message may display when you open a 3D model. To correctly display the cross hair (in fly mode) as well as support all capabilities of this operating system, the application automatically unchecks the **Enable desktop composition** setting. This setting is in **Control Panel > System > Advanced system settings > Advanced tab > Performance Settings > Visual Effects**.
- **Recovery:** If you click to see more information on the message, the **Windows** information dialog box displays. Check the **Don't show me this again** option if you do not want the above message to display each time a 3D model is opened.



## Graphics Card Information

To take advantage of the performance enhancements available for viewing 3D models, your graphics card needs to have at least the minimum requirements listed below. Cards with less than the minimum requirements are supported; however, they might not be able to successfully use all the performance enhancements.

Minimum	Recommended (for systems with large models)
OpenGL 2.0	OpenGL 2.1 or later
128 MB RAM	512 or more MB RAM

Additional requirements and/or recommendations for cards include:

- In general, workstation-level graphics cards provide better overall performance with 3D model files than desktop graphics cards.
- The card must be manufactured within the last three years.
- Use updated drivers (at least within the last 6 months).

**★IMPORTANT** Systems running Citrix and remote desktop applications currently do not support the hardware acceleration performance enhancements.

## Troubleshoot 3D Navigation

### Graphics Card Troubleshooting

**You do not see graphics in the window display of a dual-monitor setup when using an ATI V3600 FireGL (driver ver. 8.62 released on 7/21/2009) card.**

Follow the steps below to configure graphics card.

1. Select **Start > Catalyst Control Center**.
2. Select **Workstations > Settings**.
3. Click **Shared Front/Back/Z Dual Screen Mode**.
4. Click **OK** and then exit the application.
5. Reboot your system.

### The 3D Navigator is flickering.

Check your card properties and make sure you have **Hardware Acceleration** enabled.

- *Checking Hardware Acceleration Settings - Microsoft Windows 7 Instructions* (on page 227)

For NVIDIA Quadro cards, you can turn off the **Overlay** setting in the **NVIDIA** control panel.

1. Open the **NVIDIA Control Panel** application.
2. Go to **3D Settings > Manage 3D Settings**.
3. Select **Off** for the **Enable Overlay** setting.

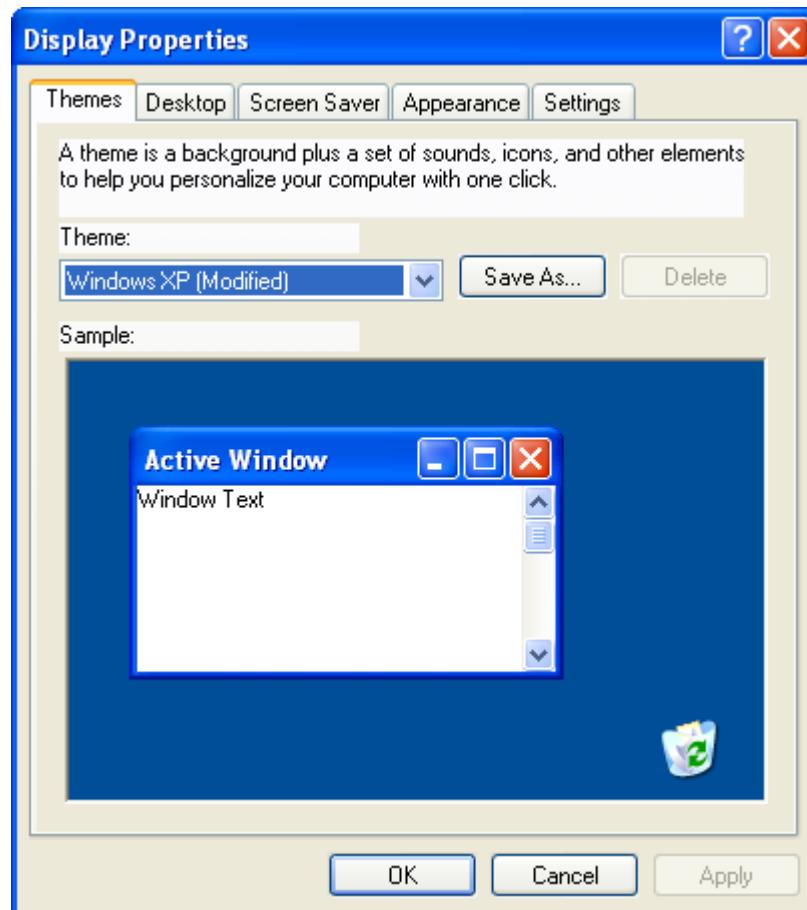
4. Save your change and close the application.

### General Display Issues

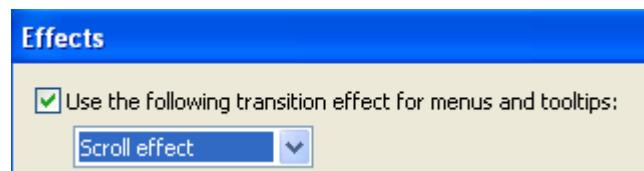
#### The 3D Navigator tooltips are flickering.

Set the transition effect for menus and tooltips to the **Scroll Effect**:

1. From your desktop, right-click and select **Properties** to open the **Display Properties** dialog box.



2. Click the **Appearance** tab.
3. Click **Effects** and select **Scroll Effect** under the **Use the following transition effect for menus and tooltips** setting.



4. Click **OK** to save your change.
5. Click **OK** to close the **Display Properties** dialog box.

## General Messages

The color scheme has been changed to [Windows 7]. A running program isn't compatible with certain visual elements of windows.

- **Meaning:** This message may display when you open a 3D model. To correctly display the cross hair (in fly mode) as well as support all capabilities of this operating system, the application automatically unchecks the **Enable desktop composition** setting. This setting is in **Control Panel > System > Advanced system settings > Advanced tab > Performance Settings > Visual Effects**.
- **Recovery:** If you click to see more information on the message, the **Windows** information dialog box displays. Check the **Don't show me this again** option if you do not want the above message to display each time a 3D model is opened.

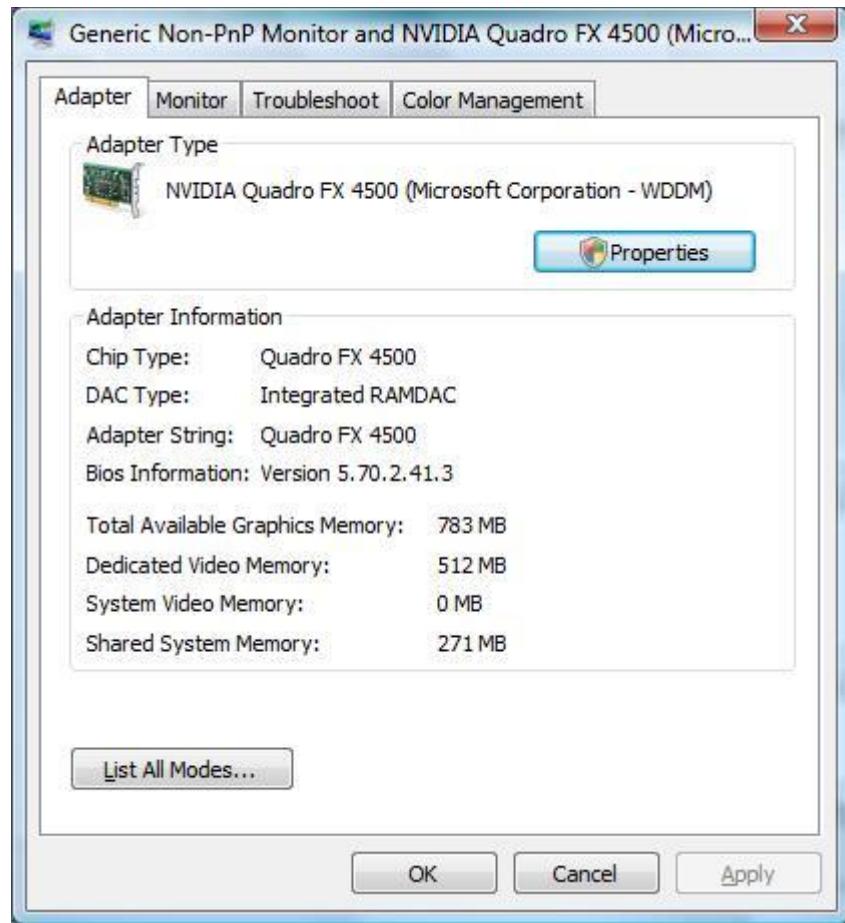


## Checking Hardware Acceleration Settings - Microsoft Windows 7 Instructions

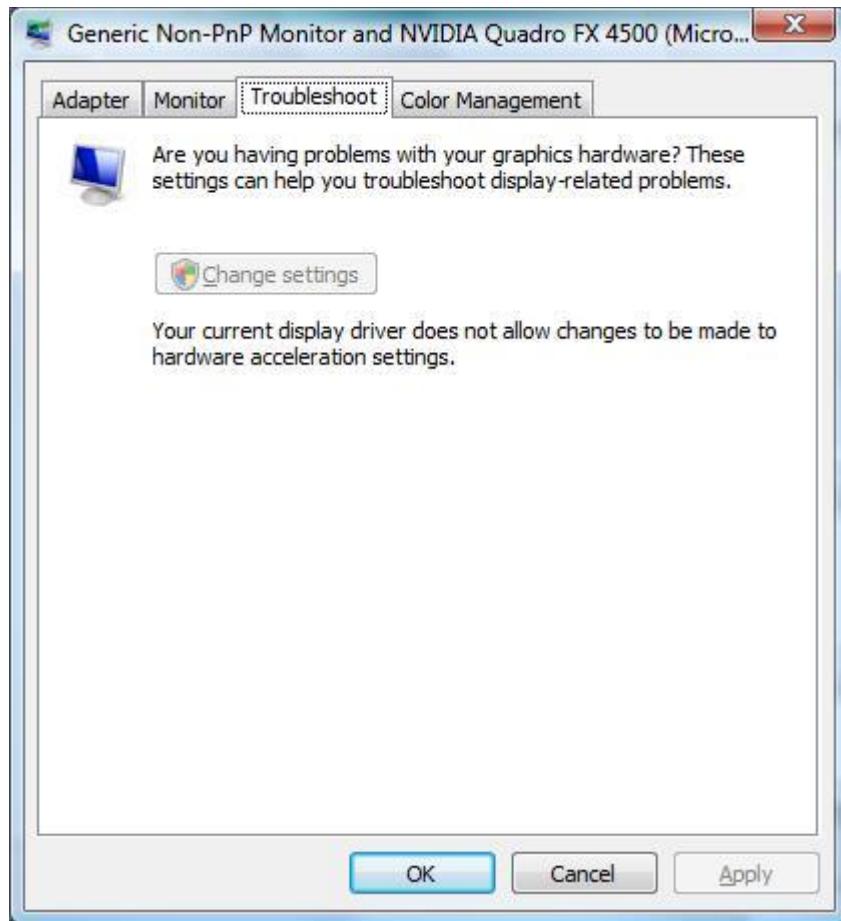
**NOTE** The images used in the steps below show NVIDIA card settings, which represent just one type of card that can be used. These images are intended to be used only as examples. The settings for your graphics card may differ from those shown in the steps below.

1. Select **Start > Control Panel**.
2. Select **Appearance and Personalization > Display Settings**.

3. Click **Advanced Settings**.



4. Click the **Troubleshoot** tab.



**NOTE** If your driver does not allow changes (as shown in the above image), you may have to contact your video card manufacturer for instructions on turning on/off hardware acceleration.

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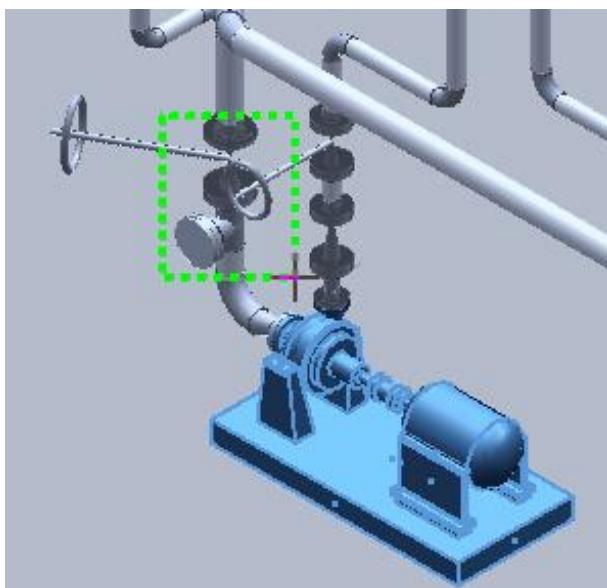
5. If available, click **Change settings**.



6. Move the **Hardware acceleration** slider bar to **Full**.
7. Click **OK** to save edits and exit the dialog box. Click **OK** again to exit the **Display Settings** dialog box.

## Zoom Area

 Magnifies an area of the model. Click and drag to create a fence around an object or area of the model that you want to enlarge.



## Fit

 Fits the selected objects in the active view. If there are no selected objects, this command works like SHIFT + Fit  and fits all visible objects in the workspace in the active view.

If you select any objects before clicking **Fit** , the software fits only the selected objects in the view. In this situation, the software fits all objects, including those marked as *Hidden* in the Workspace Explorer, or those clipped from the view.

Press CTRL + Fit  to display the selected objects in all open graphic views.

- Click **Fit**  to display all of your selected objects in the active view.
- Press SHIFT and click **Fit**  to display the visible objects in the active view.
- Press CTRL and click **Fit**  to display the selected objects in all views.
- Press SHIFT + CTRL and click **Fit**  to display all visible objects in all views.

None of these combinations cancels any previous command. When the software finishes the fit, it returns to the previously active command.

- **NOTE** Press ALT + F5 to return to the previous active view.

## Pan

 Moves the view up, down, left, or right to let you see other areas of the model. The pointer displays as a hand when this command is active. The shortcut key for this command is CTRL+SHIFT+P.

You can use the mouse scroll wheel to pan the views without invoking the **Pan** command. CTRL+Rotate Scroll Wheel pans the view up and down. CTRL+SHIFT+Rotate Scroll Wheel pans the view left and right.

## Center View by Object

 Centers a view based on a given point or object by panning the view such that the selected point is the center of the view. The zoom and clipping level is not affected by using this command.

### Select Object or Point

Allows you to select a point or object.

### Select View

Allows you to select a view where you want the point or object to be centered.

1. Click **View > Center View by Object** .
2. Click **Select Object or Point**  to select a point or an object.  
*The selected point is now the center of the view.*
3. Click **Select View**  to select a view to be centered.

## Apply View Style

Applies a selected style to the active view or to all views.

If you want objects of the same type to look alike, you can use styles, which are collections of formats you can apply to views and the objects in the views. You can define styles using the **Format > Style** command. Then, you can select a style and apply it to the active view or to all views.

Using styles ensures consistency. If you place one or more objects, the formats in the style apply directly to the objects. You do not have to spend time formatting them by setting several options on a ribbon or dialog box. Therefore, you can apply the formats in each style again and again.

### Applying Styles

The style type determines the type of object to which you can apply a style. The software applies styles automatically, and you can change the styles that apply to objects.

In the Drawings and Reports task, you can apply a text style to text. You can apply a fill style to a fill and a line style to lines, arcs, circles, and ellipses. You can apply a dimension style to dimensions or text balloons.

In the design tasks, you can apply view styles to three-dimensional views of a model. You can also apply surface styles to the faces of objects.

### Applying Styles to Multiple Objects

Selecting multiple objects and then applying the same style removes any previous formats. The objects now all have the formats from the style you applied. To apply this method, you must select objects that are in the same style type, such as dimension or text. For example, in the Drawings and Reports task, you cannot apply a line style to a dimension.

In the design tasks, you can apply the same view style to multiple views with the **Apply View Styles** command on the **View** menu.

To define viewing properties for curves and surfaces, you can use surface style rules, which define a style for a set of objects in the workspace.

## Apply a Style to a View

1. Click **View > Apply View Style**.
2. Select a view style from the list on the **Apply View Style** dialog box.
3. Click **Apply** to apply the style to the active window.
4. Click **Apply All** to apply the style to all open windows.

### NOTES

- To define a view style, click **Format > Style**, and then click **New** on the **3D View** tab. To modify an existing style, select it on the **3D View** tab, and click **Modify**. For more information, see *Format View* (on page 296).
- You can also apply a style to the active view by clicking **Format > Style** and then clicking **Apply** on the **3D View** tab.

## Apply View Style Dialog Box

Sets options for applying new view styles to the workspace.

### **View Styles**

Lists all the currently available view styles you can apply to the active view.

### **Apply**

Applies the selected style to the active view.

### **Apply All**

Applies the selected style to all views.

### **Cancel**

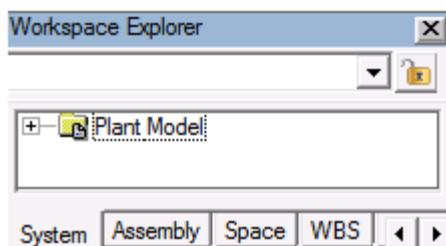
Closes the dialog box without any changes.

### **See Also**

- [Apply a 3D View Style \(on page 312\)](#)
- [Apply a Style to a View \(on page 232\)](#)
- [Apply a Surface Style \(on page 310\)](#)
- [Create a 3D View Style \(on page 312\)](#)
- [Delete a Surface Style \(on page 311\)](#)
- [Delete a View Style \(on page 313\)](#)
- [Format a View \(on page 297\)](#)
- [Modify a Surface Style \(on page 311\)](#)
- [Modify a View Style \(on page 313\)](#)

## Workspace Explorer

Displays and hides the **Workspace Explorer** window. The **Workspace Explorer** displays the contents of the workspace in a classification hierarchy that reflects the various relationships defined for the design objects. The content represents the current objects loaded from the database into the active workspace.



### **System tab**

Displays all the objects in the workspace according to the hierarchy of the system. Usually, the Model is the first system and subordinate systems can include anything that is in your workspace definition, such as piping or equipment. You can change the owning object for a System object by selecting **More** in the **System** box on the ribbon that appears when you select an object.

### **Assembly tab**

Displays all the objects in the workspace, grouped by assemblies.

**Space** tab

Displays all the volumes in the workspace.

**Work Breakdown Structure (WBS)** tab

Shows the objects in the workspace grouped by project, contract, area, and so forth.

**Analysis** tab

Displays the structural analysis models in the workspace. An analysis model is a non-graphical and logical grouping of member systems that can be sent to a third-party analysis and design solver package.

**Reference** tab

Displays the files attached in the workspace. This tab appears after you attach a file by clicking **Insert > File**. For more information, see *Insert File* (on page 260).

**Reference 3D** tab

Displays hierarchy of Reference 3D projects and files attached as well as their objects in the workspace. This tab appears after administrator attached a R3D Model by using New R3D Reference command in Project Management.

**Point Cloud** tab

Displays the available point cloud objects in the workspace. This tab appears only if there are any registered point cloud vendors in the Model.

**Drawings** tab

Displays the drawings related to the workspace. For more information, see *Drawing Console* (on page 454).

The **Workspace Explorer** view allows you to identify or select objects or sets of objects by name. Icons appear at the left of the window objects to indicate the type of the object. For example, a file folder icon represents a system, an equipment icon represents equipment, an I-beam icon represents a structural system, and so forth. Point to objects in the **Workspace Explorer** to highlight them, and click objects to select them. If you hide objects using the **Tools > Hide** command, the object names appear in italics. For more information on hiding objects, see *Hide* (on page 381).

If you pause the pointer over an object in the **Workspace Explorer**, the object is highlighted with the highlight color in the graphic view and in the **Workspace Explorer**. If you pause the pointer over an object in a graphic view or in the **To Do List** dialog box, the object is highlighted with the highlight color in the **Workspace Explorer**. However, if you select certain objects such as features in a graphic view, they do not highlight in the **Workspace Explorer** (because features do not appear in the **Workspace Explorer**). Foundation ports also do not appear in the **Workspace Explorer**, but nozzles do.

If you select an object in the **Workspace Explorer**, it appears highlighted with the select color in the graphic view. However, if you are in the **Drawings** tab and you select a drawing, no objects in the drawing are highlighted in the graphic view. If you select an object in a graphic view, it is highlighted with a gray background in the **Workspace Explorer**. The **Workspace Explorer** automatically scrolls when objects are highlighted if the object is outside the **Workspace Explorer** window. Automatic scroll is not available if the object is already in the **Workspace Explorer** window.

If you select a set of objects, but the set contains objects you do not want, press CTRL and click to cancel the selection of unwanted objects. For multiple selections, press CTRL+SHIFT. If you

select a parent object and then press SHIFT and click the last listed child of the parent, you get the parent and immediate child objects belonging of the parent. A right-click allows you to select the parent and all nested children of the parent.

If you are currently working in a command, you can select multiple objects in the **Workspace Explorer** without holding CTRL or SHIFT.

In the **Workspace Explorer**, you can select or type a name in the box at the top of the view. The list displays the last 15 objects you selected that satisfy the current select filter. Also, you can use the wildcard \* (asterisk character) when typing the name in the box at the top of the view. If you are in the **Drawings** tab, the search results display one at a time. Press ENTER to navigate through these search results.

## NOTES

- You can widen or narrow the **Workspace Explorer** window for better viewing.
- You can also display or hide the window by selecting the **Workspace Explorer** command on the **View** menu.
- If you choose to close the window, when you reopen it, the window displays identically as when you closed it.
- You can complete basic command functions, such as copy, paste, and delete in the **Workspace Explorer** window. Drag and drop is not currently supported by the **Workspace Explorer**.
- You can create a new system in the **Workspace Explorer** by right-clicking an existing system on the **System** tab.
- If you select an object in the **Workspace Explorer** that another user has deleted, the following message appears in the graphic view: **Removing the object from working set because it was not located in the database. Please refresh data.**
- The list of child objects under the Assembly hierarchy root appear sorted when a workspace is defined, but can become unsorted during modeling. To sort this list, use the **Refresh Workspace Explorer** command from the **Workspace Explorer** shortcut menu. To display this menu, right-click in the **Workspace Explorer** white space area. This behavior applies only to child objects of the Assembly hierarchy root. All other hierarchies and nodes in the Assembly hierarchy are not affected by this change.

## Workspace Explorer

Displays and hides the **Workspace Explorer** window. The **Workspace Explorer** displays the contents of the workspace in a classification hierarchy that reflects the various relationships defined for the design objects. The content represents the current objects loaded from the database into the active workspace. The names of objects appear in alphabetical order within the hierarchy.

The **Workspace Explorer** window allows you to identify or select objects or sets of objects by name. Icons appear at the left of the objects to indicate the type of object. For example, a file folder icon represents a system, an equipment icon represents equipment, and so forth. Move the mouse over objects in the **Workspace Explorer** to highlight, and click objects to select them. If you hide objects using the **Tools > Hide** (on page 381) command, the object names appear in italics.

## Show or Hide Workspace Explorer

Click **View > Workspace Explorer**.

 **TIP** A check mark appears beside the **Workspace Explorer** command on the **View** menu when the **Workspace Explorer** window is visible.

### NOTES

- You can narrow or widen the **Workspace Explorer** window for better viewing. When you place the pointer on the line that divides the **Workspace Explorer** from the graphical windows, it becomes an arrow that you can use to drag the dividing line to the left or right.
- When you select objects in a graphical view, the software also selects the objects in **Workspace Explorer**. To cancel selection of objects in the **Workspace Explorer** window, select the object again while holding CTRL.
- If you select an object in the **Workspace Explorer** that another user has deleted, the following message appears in the graphic view: **Removing the object from working set because it was not located in the database. Please refresh data.**
- You can complete basic command functions, such as copy, paste, and delete in the **Workspace Explorer** window. The shortcut keys for the **Copy** command are **CTRL+C** and for the **Paste** command are **CTRL+V**.
- You can create a new system in the **Workspace Explorer** by right-clicking an existing system on the **System** tab.
- You can create a new WBS item in the **Workspace Explorer** by right-clicking on the **WBS** tab.
- The drop-down list in the **Workspace Explorer** window has a shortcut menu. Depending on the commands that you have completed, the menu includes the **Undo**, **Copy**, **Paste**, **Delete**, and **Select All** commands. To open the shortcut menu, right-click the dropdown list.
- To select several objects at once, press CTRL or SHIFT while you click. If you are currently working in a command, you can select multiple objects in the **Workspace Explorer** without holding CTRL or SHIFT.
- If you close the window, when you reopen it, the window appears at the same width as when you closed it.

### See Also

[Define a workspace using a new filter \(on page 46\)](#)

[Define a workspace using an available filter \(on page 47\)](#)

## Select Active Project Dialog Box

Displays the existing WBS hierarchy, which you can use to specify the active project. You can access the **Select Active Project** dialog box by clicking **More** in the **Active Project** box.

**TIP** The **Active Project** box is right next to the **Permission Group** box on the main toolbar.



### Workspace

Displays WBS projects and items retrieved to the workspace based on the current **Define Workspace** filter.

### Database

Displays WBS projects and items that are in the current active database.

### See Also

*Workspace Explorer* (on page 233)

## Marine Structure Hierarchy in the Workspace Explorer

Plates and profiles gain children objects in the **Workspace Explorer** hierarchy as the model progresses from early design in Molded Forms through manufacturing parts in Structural Manufacturing. The following objects appear on the **System** tab of the **Workspace Explorer**:

### Root system

Contains the top-level properties for a plate or profile, such as continuity, tightness, material grade, and molded conventions, but does not contain all physical attributes. For example, a root plate system is a surface without thickness, and a root profile system is a landing curve.

### Leaf or child system

Inherits the properties of the parent root system. Properties can be manually changed to be different from the root system. Each root system is created with a leaf system. When the root system is split, additional leaf systems are created.

### Plate part

Inherits the properties of the parent leaf system and begins to carry physical attributes. Each leaf system has a plate part. There are two types of plate parts:

#### Light part

The initial part created in Molded Forms. Plate parts have thickness and profile parts have cross-sections, but other physical attributes are not considered. For example, parts are not trimmed at their boundaries and profile part locations are not adjusted based on plate part thickness.

#### Detailed part

Replaces the light part after detailing the part in Structural Detailing. Parts gain additional physical attributes. For example, plates are now trimmed at their boundaries; profile webs and flanges are trimmed.

### Root logical connection

Contains top-level properties for a connection between plate and profile systems. Each root logical connection is a child of a root system.

**Leaf or child logical connection**

Each root logical connection is created with a leaf logical connection. When the root logical connection is split, additional leaf logical connections are created.

**Assembly connection**

Inherits the properties of the parent leaf logical connection. An assembly connection is created when parts are detailed in Structural Detailing. Each assembly connection is a child of a leaf logical connection. An assembly connection contains properties used for physical connections (welds) and features such as end cuts, slots, and collars.

**Feature**

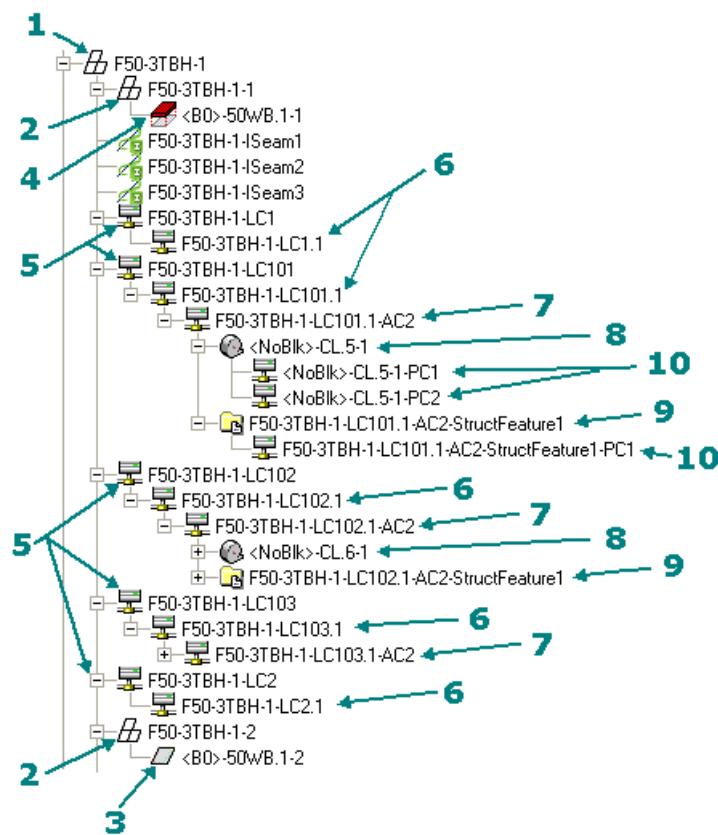
Contains properties and physical attributes for detailed features such as end cuts, slots, or collars. A feature is created when parts are detailed in Structural Detailing. Each feature is a child of an assembly connection.

**Physical connection**

Contains properties and physical attributes for welds. Physical connections are created for each assembly connection when parts are detailed in Structural Detailing. End-to-end and edge-to-edge connections have one physical connection for each part. Each physical connection is a child of an assembly connection or a feature.

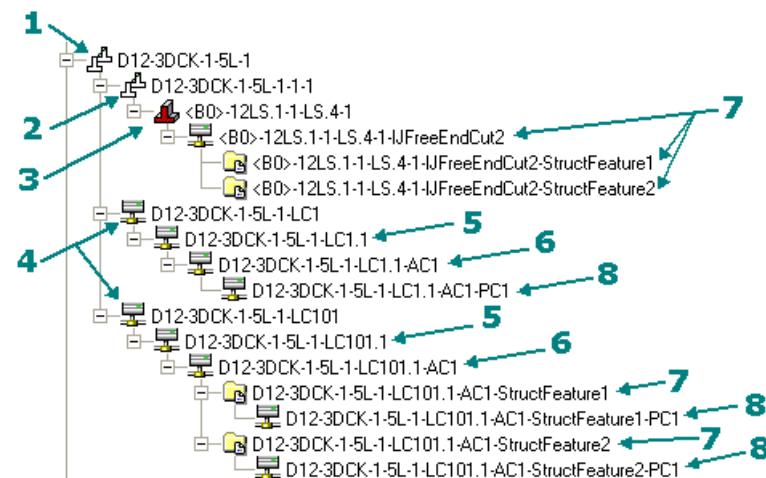
## Examples

### Plate



- 1 - Root system
- 2 - Leaf system
- 3 - Light part
- 4 - Detailed part
- 5 - Root logical connection
- 6 - Leaf logical connection
- 7 - Assembly connection
- 8 - Collar feature
- 9 - Slot feature
- 10 - Physical connection

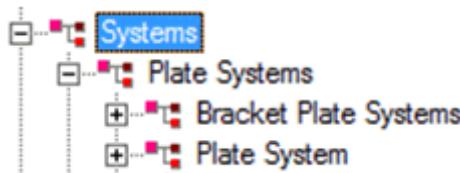
### Profile



- 1 - Root system
- 2 - Leaf system
- 3 - Detailed part
- 4 - Root logical connection
- 5 - Leaf logical connection
- 6 - Assembly connection
- 7 - End cut feature
- 8 - Physical connection

## NOTES

- Objects created in Structural Manufacturing, such as manufacturing parts, templates, and pin jigs, are children to parts, blocks, or assemblies on the **Assembly** tab of the **Workspace Explorer**.
- **Plate Systems** display at the same level in the hierarchy as **Bracket Plate Systems**. If you filter on **Plate Systems**, the software also displays **Bracket Plate Systems** as shown in the following figure. This happens because the leaf system of a bracket plate system is a plate system object. The bracket plate system is included in the workspace because it is the parent of the leaf plate system.



## **Reference 3D Hierarchy in the Workspace Explorer**

You can show the hierarchy of objects in each Reference 3D model that you have attached in Project Management of the type **SmartPlant Interop Publisher** or **S3D**. The Reference 3D model objects contain relationships such as pipeline systems and related pipe runs, pipe runs and related pipe parts, and so forth. When you select a 3D model to view its object hierarchy, the hierarchy content is saved when you save the session file.

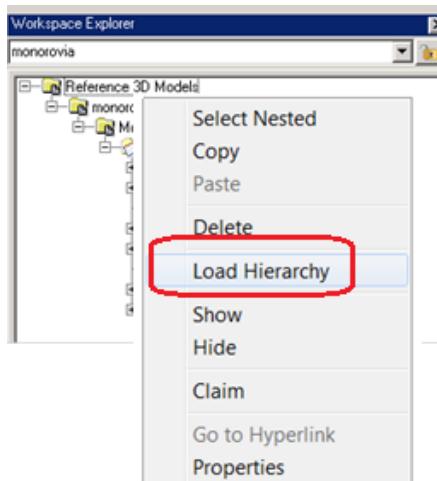
### Workflow

To display the Reference 3D object hierarchy:

1. Select the **Reference 3D** tab in the **Workspace Explorer**.



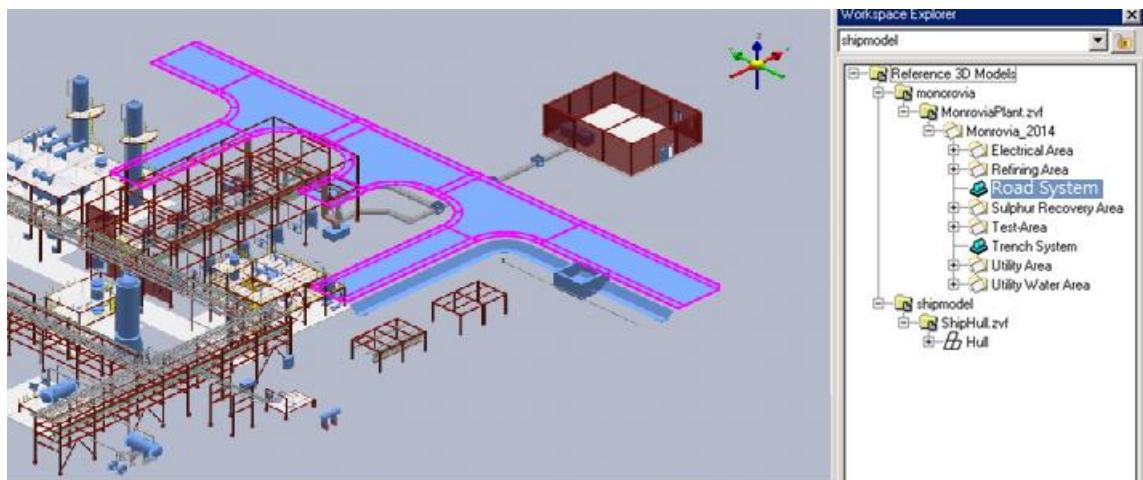
- Select the Reference 3D model for hierarchy display, and then right-click to select **Load Hierarchy**.



### NOTES

- The **Load Hierarchy** command displays only for Reference 3D models attached in Project Management with either the **SmartPlant Interop Publisher** or **S3D** model type. For more information, refer to the **Attach Reference 3D Model** section in the *Project Management User's Guide*.
- Each Reference 3D model can contain multiple files. If one of the files under the selected reference 3D model is not loaded into the current session, the software does not load the hierarchy for that file. When you load the missing file into the session, the software automatically loads and displays the object hierarchy.
- If you exclude all the children Reference 3D physical objects, the software removes the corresponding child and parent nodes from the Reference 3D hierarchy upon a refresh.
- Icons display for all Reference 3D objects in the **Workspace Explorer**. For some object types, the same icon is used to represent the same object types. For example, equipment and designed equipment have the same icon.

- Click each file node to show the available object hierarchy.

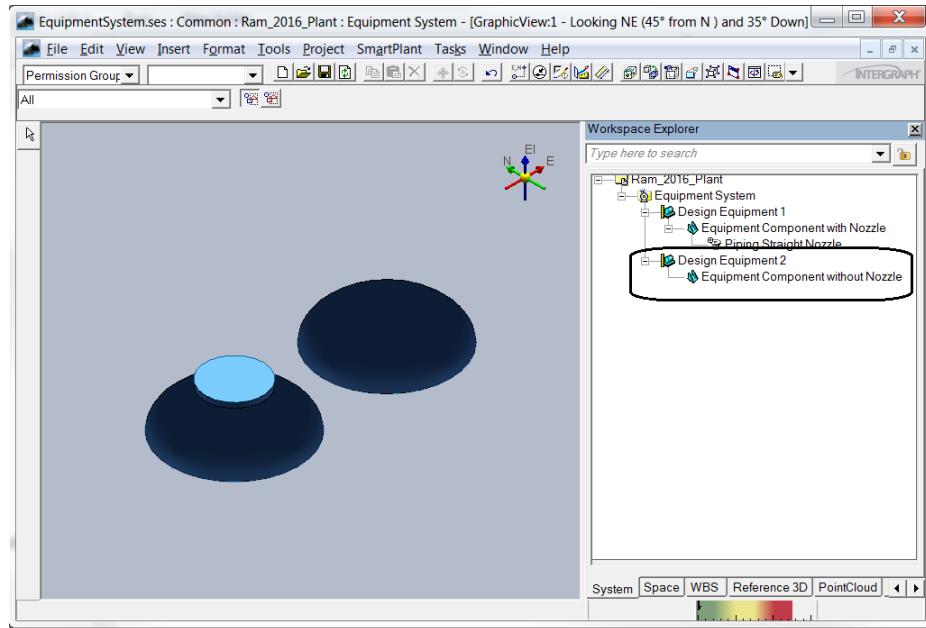


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4. You can perform operations in the graphical view such as **Show**, **Hide**, and view **Properties** for objects that you select in the hierarchy.

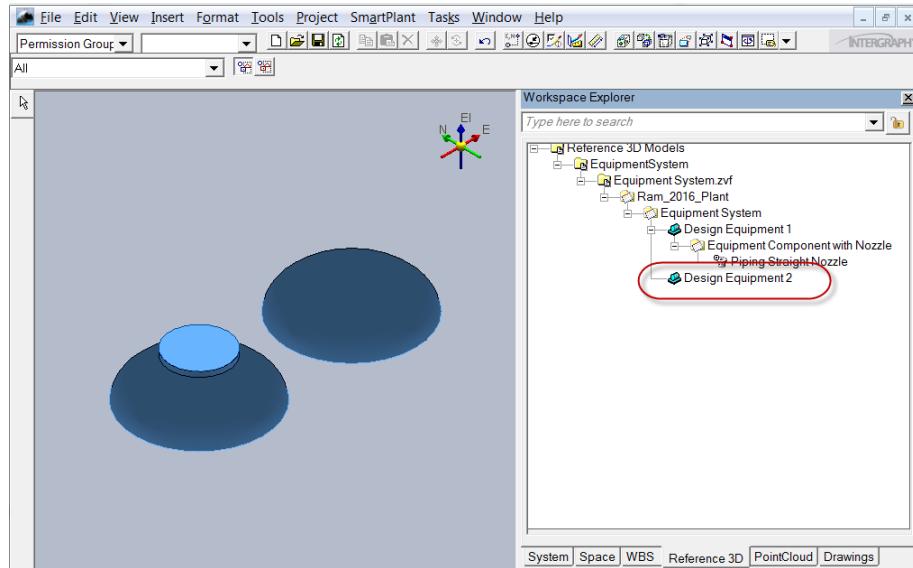
### Limitations

- Equipment components without any nozzle children are not displayed in the hierarchy. The example below shows a native object hierarchy in Smart 3D with **EquipmentComponentwithoutNozzle** under **Design Equipment2**.



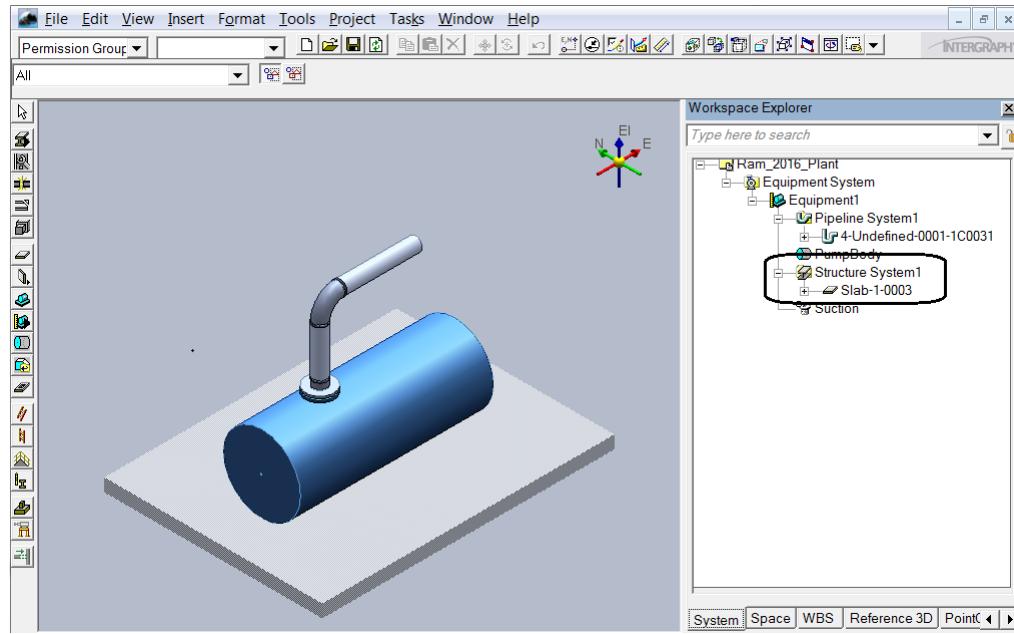
The next image shows that same hierarchy as Reference 3D data.

**EquipmentComponentwithoutNozzle** does not display under **Design Equipment2**.

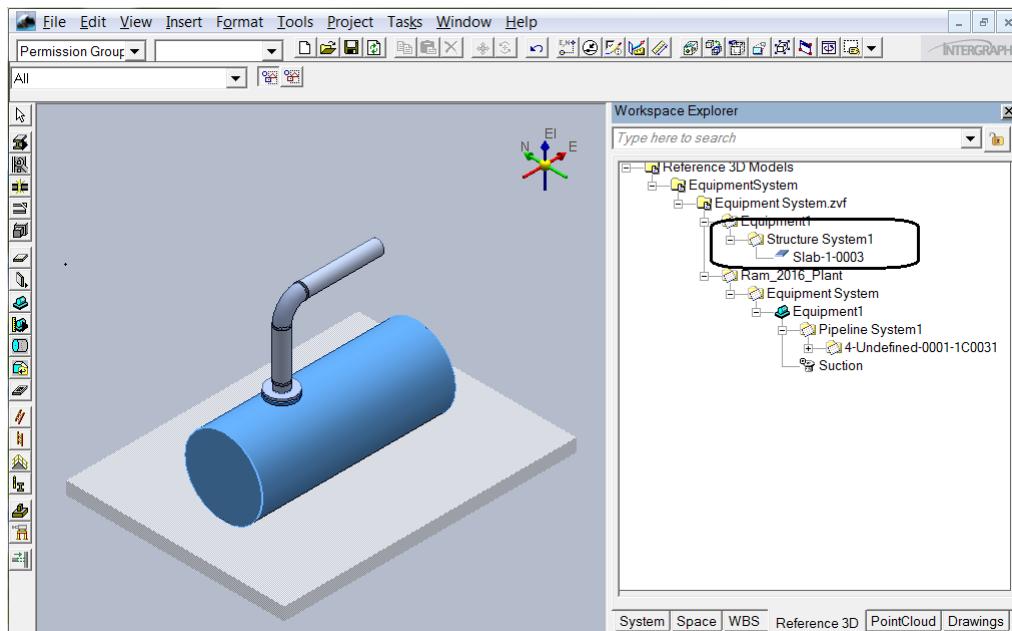


- Systems, other than pipeline systems, placed under equipment do not display the correct hierarchy for dataset attachments generated from SPRDirect. The systems are instead placed under the root node. 3D Model Data attachments display the correct hierarchy.

The example below shows how a native object hierarchy displays in Smart 3D with **Pipeline System1** and **Structure System1** under **Equipment1**.



The next image shows the same hierarchy in Reference 3D. Note that **Structure System1** is not grouped under **Equipment1**, but under the root node.



## See Also

*Exclude and Include Reference 3D Objects* (on page 383)

## Reference 3D Model Properties Dialog Box

Defines properties for reference 3D models from the **Reference 3D** tab on the **Workspace Explorer**.

### Topics

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## Reference 3D Model Properties Dialog Box

Defines properties associated with the 3D model that you are modifying.

### Model Name

Specifies a model name.

### Description

Specifies a description of the model.

### Model Type

Indicates the authoring tool used to create a referenced model. The following options are available:

- **S3D** - Use this option for a 3D model generated from Smart 3D in .zvf and .xml format.
- **PDMS** - Use this option for a Reference 3D model converted to .zvf and .drv from PDMS files in .rvm and .att formats.
- **PDS** - Use this option for a 3D model generated from PDS as legacy SPR data in .drv and .dgn graphics converted to .zvf or published PDS data in .zvf and .xml format. Each option uses a different set of mapping files.
- **Generic** - Use this option for all Reference 3D models with data files in the standard .drv format. Generic schema and mapping files might be required using the delivered **Generate Mapping Tool** utility. For more information, see Use the GenerateMapping tool.
- **SmartPlant Interop Publisher** - Use this option for all Reference 3D models with data files generated from the SmartPlant Interop Publisher application. This option reads .zvf and .mdb2 files created from SmartPlant Interop Publisher to persist graphic data, mapped property data, and relationships. If you have added new classes, interfaces, and properties using the customized mapping files from SmartPlant Interop Publisher, you must create the CustomR3DSchema.xls file, and place it in the Reference3DComponents subfolder of the SharedContent folder. For more information, see Custom Schema and Mapping Files.
- **Graphic\_Only** - Use this option for all Reference 3D models that do not have data files.
- **CADWorx** - Use this option for all reference 3D models with data files in the .dwg format generated from CADWorx, and then published by SmartPlant Review Publisher. Sample schema and mapping files are delivered with Smart 3D.

#### Interference Detection

Indicates whether the Reference 3D model participates in interference detection.

 **NOTE** Reference 3D models that contain tessellated data take a significant amount of time for interference checking to process. For better performance, do not include these models in interference detection.

#### File Path

Specifies the path or location of the Reference 3D folder. You can create and organize subfolders for additional levels of filtering and level/layer control.

 **NOTE** The software only supports .zvf graphic files with corresponding data in .xml or .drv files.

#### Permission Group

Specifies object level modifications to Reference 3D models such as excluding and including an element in Smart 3D, and changing construction properties. However, the defined model permissions control new Reference 3D model attachment, detachment, and update operations. If you do not assign a permission group to a model, the model permissions control the operations on Reference 3D model objects. The menu list displays the permission groups that have been created for the model.

## ***Configuration Tab***

Displays the creation, modification, and status information about an object.

### **Model**

Displays the name of the model. You cannot change this value.

### **Permission Group**

Specifies the permission group to which the object belongs. You can select another permission group, if needed. Permission groups are created in the Project Management task.

### **Approval State**

Indicates the approval state of the object.

### **Status**

Specifies the current status of the selected object or filter. Depending on your access level, you may not be able to change the status of the object.

### **Date Created**

Displays the date and time that the object was created.

### **Created by**

Displays the user name of the person who created the object.

### **Date Last Modified**

Displays the date and time when the object was modified.

### **Last Modified by**

Displays the user name of the person who modified the object.

## ***Levels and Layers Tab***

Controls parameters for displaying levels and layers in the model. These parameters are saved in the session file.

### **All Levels**

Turns on or off display of all layers.

#### **Display**

Indicates that the layer or level displays in the graphic view.

#### **Hide**

Indicates that the layer or level does not display in the graphic view.

#### **Mixed**

Indicates a combination of displayed and hidden layers or levels. This setting has no effect on the graphic display.

## **Reference 3D Folder Properties Dialog Box**

Defines properties for reference 3D folders from the **Reference 3D** tab on the **Workspace Explorer**.

*General Tab (Reference 3D Folder Properties Dialog Box) (on page 247)*

*Configuration Tab (on page 246)*

*Levels and Layers Tab (on page 246)*

### **General Tab (Reference 3D Folder Properties Dialog Box)**

Controls general properties for reference 3D folders from the **Reference 3D** tab on the **Workspace Explorer**.

#### **Name**

Specifies the name of the reference 3D folder.

## **Reference 3D Attach Properties Dialog Box**

Defines properties for reference 3D attachments from the **Reference 3D** tab on the **Workspace Explorer**.

*General Tab (Reference 3D Attach Properties Dialog Box) (on page 247)*

*Configuration Tab (on page 246)*

*Levels and Layers Tab (on page 246)*

### **General Tab (Reference 3D Attach Properties Dialog Box)**

Controls general properties for reference 3D attachments from the **Reference 3D** tab on the **Workspace Explorer**.

#### **File Name**

Specifies the name of the reference 3D attach file.

#### **Data File Name**

Specifies the name of the reference 3D data file.

## **Reference 3D Generic Element Properties Dialog Box**

Defines properties for reference 3D objects selected from the model.

*General Tab (Reference 3D Generic Element Properties Dialog Box) (on page 248)*

*Configuration Tab (Reference 3D Generic Element Properties Dialog Box) (on page 249)*

## General Tab (Reference 3D Generic Element Properties Dialog Box)

Defines properties associated with the reference 3D object that you have selected from the model.

### Standard

These properties are read-only.

#### Name

Displays the object name.

#### Layer

Displays the layer upon which the object resides.

#### Level

Displays the level upon which the object resides.

#### Source object type

Displays the source object type for the object.

#### Type

Displays the type for the object.

#### Space

Displays the space in which the object resides.

### Fabrication and Construction

Displays the construction requirement and construction type of the Reference 3D objects. The default value for these properties is **Undefined**. You can only edit these properties when:

1. The **Model Type** for the attached Reference 3D model is set to **SmartPlant Interop Publisher** or **S3D** in Project Management. For more information, see the **Attach Reference 3D Model** section in the *Smart 3D Project Management User's Guide*.
2. The approval status for the selected object is set to **Working** and you have access privileges on the Reference 3D model containing the object.

#### Construction Requirement

Specifies the construction requirement for the object, such as **New** or **Existing**. To define or change the options on the list, edit the **Construction Requirement** select list in Catalog.

#### Construction Type

Specifies the type of construction for the object. The available types are based on the selected **Construction Requirement**. To define or change the options on the list, edit the **Construction Type** select list in Catalog.

## Configuration Tab (Reference 3D Generic Element Properties Dialog Box)

Displays the creation, modification, and status information about a reference 3D object that you have selected in the model. These properties are read-only.

### Model

Displays the name of the model. You cannot change this value.

### Permission Group

Specifies the permission group to which the object belongs. You can select another permission group, if needed. Permission groups are created in the Project Management task.

### Approval State

Displays the approval state of the object. The ApprovalReason.xls file controls the items in the **Approval State** list and must be bulkloaded. The default **Approval State** for a Reference 3D element is **Working**. The software allows modifications on Reference 3D elements such as include, exclude, and construction information properties based on the **Approval State** defined for that element. By default, you can edit or manipulate an object only when the **Approval State** is set to **Working**. For more information, see *ApprovalReason* in the *Smart 3D Reference Data Guide*.

### NOTES

- You can change the **Approval State** for elements from the Reference 3D model with a model type defined as **SmartPlant Interop Publisher** or **S3D** while attaching the model in Project Management. For elements from other model types, the default **Working Approval State** displays and modifications are not allowed.
- When you select a Reference 3D element and change its **Approval State**, the software clears the element selection when you apply the change.

### Status

Specifies the current status of the selected object or filter. Depending on your access level, you may not be able to change the status of the object.

### Date Created

Displays the date and time that the object was created.

### Created by

Displays the user name of the person who created the object.

### Date Last Modified

Displays the date and time when the object was modified.

### Model Name

Displays the name of the object.

### File Name

Displays the model name of the object.

## New System

Creates new systems in the **Workspace Explorer** without switching to the Systems and Specifications task. You can access this command by right-clicking a system on the **System** tab of the **Workspace Explorer**.

The system you are creating inherits specifications from the parent system. To remove or add specifications, you must switch to the Systems and Specifications task.

---

### What do you want to do?

- [Change a system owner \(on page 250\)](#)
- [Create a new system in the Workspace Explorer \(on page 250\)](#)

---

### Create a New System in the Workspace Explorer

1. Right-click a system in the **Workspace Explorer**. This system will be the parent of the system you are creating.
2. Click **New System** on the shortcut menu.
3. Select the type of system you want to create. For example, you can create a conduit system, an HVAC system, a piping system, and so forth.

**NOTE** The system you are creating inherits specifications from its parent. To remove or add specifications, you must switch to the Systems and Specifications task.

### Change a system owner

1. Select the **System** tab on the **Workspace Explorer**.
2. Select an object for which you want to change the owning system.
3. In the **System** box on the ribbon, select **More**. The **Select System** dialog box appears.
4. Specify whether the system is in the **Workspace** or the **Database**.
5. Select an owning system on the tree and click **OK**. The selected owning system of the object is changed as specified.

### NOTES

- You can narrow or widen the **Workspace Explorer** window for better viewing. When you place the pointer on the line that divides the **Workspace Explorer** from the graphical windows, it becomes an arrow that you can use to drag the dividing line to the left or right.
- You can create a new system in the **Workspace Explorer** by right-clicking an existing system on the **System** tab.

## Select System Dialog Box

Displays applicable systems so you can select the system you want.

### Look in

Specifies where you want to look for the system. Select **Workspace** to look for the system in your defined workspace only. Select **Database** to look for the system in the entire Model database regardless of the workspace filter.

### See Also

[Move \(on page 157\)](#)

## Rulers

Turns the display of rulers on and off. Rulers control the display of coordinate systems loaded in the workspace. Using rulers is helpful in locating a reference plane, or a point on a plane, when you place objects in the model. When you place objects in the model, you can use rulers to help you locate the exact point along a plane.

## Display rulers

1. Click **View > Rulers**.
2. Select a coordinate system or axis from the **Coordinate systems** box.

### NOTES

- You can select multiple coordinate systems or axes by holding CTRL or SHIFT.
- To turn the display of rulers off, hold CTRL and click a coordinate system or axis in the **Coordinate systems** box.

## Rulers Dialog Box

Displays the coordinate systems for which you can activate rulers. This dialog box appears when you click **View > Rulers**.

### Coordinate systems

Displays all the coordinate systems defined for the model. The systems appear in a standard hierarchy according to the grid system to which they belong. Select the system or axes for which you want to display rulers. If this list is empty, you must define coordinate systems in the Grids task.

## To Do List

Provides a list of objects in the workspace that include inconsistent data. To open the **To Do List**, click **View > To Do List**, or you can use the shortcut keys, which are **CTRL+T**.

The **To Do List** allows you to view, edit, and set review status for inconsistent data objects from the **To Do List** dialog box.

**⚠ CAUTION** You must activate the native task for the object. Otherwise, if you are working outside the native task for the object, a generic ribbon appears and you cannot edit the object in error. For example, if the object is an HVAC feature, click **Tasks > HVAC** to open the HVAC task to correct inconsistencies.

After you open the appropriate task, you can select the row with the object you want to edit. This action causes the appropriate **Edit** ribbon to appear above the active window and lets you change the data required to fix the errors. If you have write permission to an object, you can simply direct an **Out-of-date** object to update itself using its current input. Object that you cannot edit display in gray.

When you completely correct an **Out-of-date** object, the software updates all other dependent objects. You can select multiple objects from the list when you correct **Out-of-date** objects. Objects in an **Error** state are usually selected individually and corrected. After you successfully update an object, the software removes the object from the list.

If the list on the **To Do List** dialog box is long, you can click **Filter To Do List by Select Set**  on the **To Do List** dialog box to only list the items related to currently selected objects in the workspace.

You can continue to display the **To Do List** as you complete other commands.

### Why do objects go to the To Do List?

The software automatically places objects on the **To Do List** when one of the following situations occurs:

- **Error** - An object loses a relationship with another, required object. For example, the definition for a piece of equipment is deleted from the Catalog, but instances of that equipment remain in the model.
- **Warning** - An object retains all of its required relationships, but there is a problem with the relationship.
- **Out-of-date** - When changing a relationship between two objects, you modify the relationship but only have write permission to update one of the objects. For example, you move a tank to the left 5 meters, but you do not have write permission to modify the pipe that is routed to that tank. The piping appears in the **To Do List**.

**💡 NOTE** If you add new data for piping material class rules, the software does not mark pipe runs as **Out of date** on the **To Do List**.

Two methods are available to change a write permission relationship between user and object. The first method is assigning each object to a group that defines a list of users; for each user, that list specifies the level of access for the objects. Your administrator sets these permissions in the Project Management task.

The choices for access permissions include:

- **Read** - The user can read only.
- **Write** - The user can read, create, change, and delete.
- **Full Access** - The user can read, write, and assign approval (move status as defined below).

This method allows users with **Write** and **Full Access** permissions to write to the object. Users with **Read** cannot.

The second method for changing the relationship is assigning each object with a status of work progress. You can view or change these statuses on **Properties** dialog boxes. The possible statuses include:

- **Working**
- **In Review**
- **Rejected**
- **Approved**

For **Working** status, all access permissions listed earlier might apply (**Read**, **Write**, or **Full Access**). However, other work statuses block even a user with **Write** access permission.

For example, **Approved** status blocks a user with **Write** access from changing the relationship (except for the user designated as an approver). Therefore, the processing stops, and the software lists the object on the **To Do List** as **Out-of-date**.

**Working** is the only status that is not read-only. You cannot add a new status or revise its characteristics. For example, a designer, who has write access, changes the status from **Working** to **In Review**. An administrator, who has full control access, can change the status from **In Review** to either **Approved** or **Rejected**.

### [To Do List Dialog Box \(on page 255\)](#)

### [To Do Record Meter \(on page 258\)](#)

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## What do you want to do?

- *Fix objects with errors* (on page 254)
- *Update out-of-date objects* (on page 254)
- *Display objects on the To Do List* (on page 255)

---

## Fix objects with errors

1. Click **View > To Do List**.
2. On the **To Do List** dialog box, review the listed objects, and decide which one you want to correct.
3. Switch to the task associated with the object. Click the **Tasks** menu and then select the appropriate task. For example, if you want to first correct a piping problem, click **Tasks > Piping**.  
**⚠ CAUTION** You must activate the native task for the object. Otherwise, if you are working outside the native task for the object, a generic ribbon appears and you cannot edit the object in error.
4. Select a row with the object for which you want to show related objects in an **Error** state.
5. Edit the object using the appropriate tools on the **Edit** ribbon at the top of the active window.

### NOTES

- **Error** objects are usually edited one at a time. However, you can also select more than one **Error** object if an **Edit** command supports multiple objects.
- If a constraint system fails and objects enter the **Error** state and are not recomputed, the objects of the constraint system are displayed in nested order on the **To Do List**. Each nested object displays values for its properties.

## Update out-of-date objects

1. Click **View > To Do List**.
2. Select the row containing the object you want and show the related objects in an **Out-of-date** state.
3. On the **To Do List** dialog box, update the data by clicking **Update**   
*A progress bar appears as objects are updated.*

### NOTES

- When you update an object in the **Out-of-date** state, the software refreshes the object using its current input. In addition, the software updates all objects that depend on the object.
- You can select more than one **Out-of-date** object at the same time, and then update by clicking **Update** .

## Display objects on the To Do List

You can control what objects are displayed and what columns of information are shown on the **To Do List**.

1. Open the **To Do List** by clicking **View > To Do List** or by pressing CTRL+T.
2. Click **Properties**  to open the **To Do List Properties** dialog box (on page 257).  
**TIP** You can also open the **To Do List Properties** dialog box by right-clicking outside the grid area on the **To Do List** dialog box and selecting **Properties** on the shortcut menu.
3. In the **Display** field, select the types of objects that you want to display on the **To Do List**.

For example, you can isolate objects that exist in a permission group in which the user has a minimum of **Write** access permission (**Write** or **Full Control**) by selecting the option labeled **Only objects which the user has permission to resolve**. You can filter the **To Do List** by user by selecting the **Only objects last changed by** option and then specifying a user. In addition, you can determine whether ignored objects are displayed in the **To Do List** by checking or clearing the **Ignored items** option.

4. In the **List** field, select the columns that you want to display on the **To Do List**.
5. Click **OK**.

If the list on the **To Do List** dialog box is long, you can click **Filter To Do List by Select Set**  on the **To Do List** dialog box to only list the items related to currently selected objects in the workspace.

 **NOTE** You can use **Auto Fit**  to view objects on the list in the active graphic view.

## To Do List Dialog Box

**View > To Do List** displays objects in the workspace that have inconsistent data. The **To Do List** dialog box allows you to edit these objects from a single location. To correct errors, select objects from the list and modify them using the appropriate commands on the **Edit** ribbon. Check your selection filter setting if you are having trouble selecting a **To Do List** entry. The **To Do List** displays objects in gray that you cannot update.

You can change the sort order of items in the **To Do List** by clicking column headings. The default sorting is alphabetical with **Error** objects listed and then the **Out-of-date** objects.

### **Properties**

Opens the **To Do List Properties** dialog box, which allows you to choose the objects that appear in the **To Do List**, as well as choosing display options. For more information, see *To Do List Properties Dialog Box* (on page 257).

### **Update**

Updates the selected out-of-date objects. This option is disabled if:

- The object has a non-working approval status. Working status is set on the *Configuration Tab* (on page 151) of the object's properties.
- The object belongs to another global workshare site.
- You do not have sufficient permissions to edit the object.

 **Filter To Do List by Select Set**

Shows only those **To Do List** entries that are related to the selected objects in the graphical views or **Workspace Explorer**. When the **To Do List** contains hundreds or thousands of records, this option can be useful for filtering the **To Do List**.

If no objects exist in the select set when this option is checked, the **To Do List** appears empty. This option works in conjunction with the other check boxes under **List** on the **To Do List Properties** dialog box. For example, if the **Only objects which the user has permission to resolve** box is checked, then nothing shows in the **To Do List** if you select an out-of-date object that you do not have permission to resolve.

 **Clear Filter**

Removes the select set filter from the **To Do List** and displays all records for the workspace.

 **Review Status**

Changes the **Review status** of the selected **To Do List** entry. The **Review status** is either blank or **Ignored**.

 **Help**

Opens the **Troubleshooting** help file, which contains information about **To Do List** messages. To go directly to information about a message, select the message from the list, and then click **Help** .

 **Auto Fit**

Automatically fits in a graphic view the object associated with the **To Do List** entry that you selected in the listing.

 **Note**

Provides an expanded description of the problem. Point to the text in this field to display the informational note as a ToolTip. The software automatically creates the note and its contents.

**Object name**

Lists the name of an object, if assigned (for example, **Pump No. 42**). For an entry in a nested constraint system, **Constraint Set** is displayed.

**State**

Specifies if the objects on the list are in an **Out of date** or **Error** state.

**Changed by**

Lists the user name of the person who changed the object that caused the **Out of date** or **Error** state.

**Date modified**

Displays the date and local time when the object was modified, which resulted in a failure to recompute.

**Discipline**

Displays the discipline of the object with the **To Do List** entry.

**Review status**

Displays the review status of the **To Do List** entry. The status is either blank or **Ignored**. By default, this field is blank. To change the **Review status** of an entry, select the entry and click the **Review Status** button .

## **To Do List Properties Dialog Box**

Sets options for the information that appears on the **To Do List** dialog box. You can filter the objects you want to list, based on the state and user permission. Also, you can select the columns that display in the **To Do List** grid.

### **Display**

Designates the contents in the **To Do List** dialog box.

#### **Error objects**

Occurs when relationships between two objects are discrepant. The computation process for the objects does not complete.

#### **Out-of-date objects**

Occurs when you have write permission to edit an object but do not have write permissions to edit associated objects. If you select both the **Error objects** and **Out-of-date objects** boxes, all objects appear in the **To Do List** dialog box.

#### **Warning objects**

Occurs when relationships between two objects are discrepant, but the computation process for the objects is complete. You must check the objects and correct any discrepancies.

#### **Ignored items**

Determines whether to display **To Do List** entries that have a **Review status** of **Ignored**. By default, this option is not selected.

#### **Only objects which the user has permission to resolve**

Includes only those **To Do List** objects to which the user has write access.

#### **Only objects last changed by**

Allows you to filter the **To Do List** by the user who last modified objects. You can choose from the "modified by" users who have a **To Do List** record within the collection. This option is useful when the **To Do List** is very long, and you want to see your own entries only (not necessarily all entries you can fix). The default setting for this option is unchecked.

#### **Discipline Information**

Determines whether to display **To Do List** entries based on which disciplines that you select in the drop-down menu. This option is useful when you want to only see entries from a particular discipline or if you want to exclude entries from a particular discipline.

#### **List**

Specifies the columns of information to include on the **To Do List** dialog box. You must select at least one option listed in the **Display** section.

**Note**

Provides an expanded description of the problem. Point to the text in this field to display the informational note as a ToolTip. The software automatically creates the note and its contents.

**Object name**

Lists the name of an object (for example, **PUMP001A\_IMP\_Asm-1-0001**).

**State**

Identifies if the objects on the list are **Out of Date** or in an **Error** state.

**Changed by**

Lists the user name of the person who changed the object that caused the **Error** or **Out of Date** state.

**Date modified**

Displays the date the change occurred.

**Discipline**

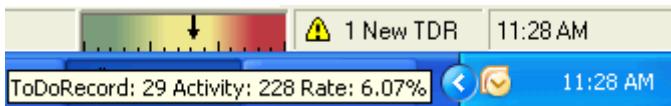
Displays the discipline of the object with the **To Do List** entry.

**Review status**

Displays the review status of **To Do List** entries.

## To Do Record Meter

The **To Do Record Meter** appears in the status bar of the software. The meter gives quick feedback on the number of new records created on the **To Do List** in the current session.



The meter uses a rate of to do record (TDR) generation based on total TDRs created in the session per total number of objects modified in the session. **Error** and **Warning** records are included in the TDR count, but **Out-of-date** records are not included. By default, **Warnings** are weighted less heavily than **Errors**; two **Warnings** count as one. The following equation is used:

$$\text{TDR rate} = ((0.5 * \text{Warnings} + \text{Errors}) / \text{Activity}) * 100$$

The **To Do Record Meter** has the following components:

**Meter**

Graphically displays the TDR rate. The pointer starts on the left at the start of a new session, and moves to the right — from green to red — as new TDRs are generated.

**Tooltip**

Appears when you pause the cursor over the meter. The tooltip displays:

- **To Do Records** - The total number of **Error** and **Warning** to do records created in the session.
- **Activity** - The total number of objects modified in the session.

- **Rate** - The TDR rate expressed as a percentage.

**Message**

Shows the number of TDRs created by the last completed command.

## SECTION 7

# Insert Menu

The **Insert** menu provides commands for adding additional information to the workspace, such as reference files, control points, hyperlinks, and construction graphics. Some of the commands on this menu may change depending on the active task.

### In This Section

Insert File .....	260
Hyperlink.....	268
Note .....	270
Control Point.....	273
Construction Graphics .....	289

## Insert File

Use the **Insert > File** command to add reference files (objects) to the **Workspace Explorer**. After these objects are added to the **Workspace Explorer**, you can include them in your model. Although these reference files can be located anywhere that is accessible from the network, we recommend that you add them into the SharedContent folder for a Global Workshare environment. The reference files can only be of the following types:

- Non-PDS (Plant Design System) MicroStation V7-format files (.dgn)
- AutoCAD 2D and 3D files (.dx and .dwg)
  - Smart 3D versions before V2009 only support 2D AutoCAD files.
  - Smart 3D version V2009 and V2009.1 support 2D and 3D files of AutoCAD version 2008 or earlier.
  - Smart 3D Version V2011 supports 2D and 3D files of AutoCAD version 2009 or earlier.

After inserting the reference files, the **Workspace Explorer** displays a **Reference** tab that shows the hierarchy of the referenced data. If you do not have the Reference tab in your Workspace Explorer, see *Change the displayed Workspace Explorer tabs* (on page 506).

**NOTE** A **Reference** tab also appears on the **Filter Properties** dialog box.

### MicroStation Units

MicroStation design files use the concept of MU:SU:PU (master units:sub-units:positional units) to express distances and to define the precision of operations. All distances in Smart 3D are stored in terms of meters. When you insert a reference file into Smart 3D, the MU:SU:PU working units are used in the unit conversion. If the MU:SU:PU are not defined within the

MicroStation file, an error appears. The recommended working units in a reference file are 1:1000:80 for the metric system (m:mm) and 1:12:2032 (ft:in) for the English system.

### NOTES

- Reference file objects are supported in interference checking. For more information, see *Checking Interferences* (on page 421).
- MicroStation SmartSolids are not rendered when they are included in a reference file.
- When troubleshooting reference files, check that the file or folder is shared with the proper permissions. Also, be sure the working units are supported; that is, the file must have units that the software can read and convert.
- To detach a reference file, select it in the **Workspace Explorer**, delete it, and then refresh the workspace.

### AutoCAD Units

Units for the 3D AutoCAD files are defined in Smart3D\Core\Runtime\SPFSPRB\Translator.ini. For more information, see *Translator.ini File Options* (on page 263).

---

### What do you want to do?

- *Insert a reference file* (on page 261)
- *Delete a reference file* (on page 262)

---

## Insert a reference file

1. Click **Insert > File**.  
*The Insert File dialog box appears.*
2. Browse to select a reference file. The file must be located in the SharedContent folder.

### TIPS

- You can insert non-PDS (Plant Design System) MicroStation V7-format files (.dgn), which can be saved from MicroStation V7 and V8. You can also insert 2D and 3D AutoCAD files (.dxr and .dwg).
- You can insert multiple files by holding CTRL or SHIFT while selecting the files.

3. Click **Open** to insert the reference file.

### NOTES

- The location and orientation of the inserted files match the currently active coordinate system.
- After you insert the files, a **Reference** tab appears in the **Workspace Explorer** to display the hierarchy of the referenced data. A **Reference** tab also appears on the **Filter Properties** dialog box.
- You can define your workspace to include the reference file objects.
- Reference file objects are supported in interference checking. For more information, see *Checking Interferences* (on page 421).

- MicroStation SmartSolids are not rendered when they are included in a reference file.
- To detach a reference file, select it in the **Workspace Explorer**, delete it, and then refresh the workspace.
- When troubleshooting reference files, check that the file or folder is shared with the proper permissions. Also, be sure the working units are supported. The file must have units that the software can read and convert.

## Delete a reference file

**NOTE** Before you can delete a reference file, it must be added to the workspace. To add a reference file to the workspace, select it on the **Reference** tab of the filter being used to define the workspace.

### From the Workspace Explorer Reference Tab

1. In the **Workspace Explorer Reference** tab, right-click the item to delete.
2. Select **Delete**.

### Using the Coordinate System

1. Select the coordinate system for the reference file that shows up in graphics.
2. Delete that coordinate system.

**TIP** Using the coordinate system removal process removes the reference file from the database.

## Reference Attachment File Properties Dialog Box

Sets options for an attached reference file you select in the **Workspace Explorer**.

### See Also

*Configuration Tab* (on page 151)

*General Tab (Reference Attachment File Properties Dialog Box)* (on page 262)

*Insert File* (on page 260)

### General Tab (*Reference Attachment File Properties Dialog Box*)

Reviews and modifies high-level properties that identify a reference attachment file.

### See Also

*Reference Attachment File Properties Dialog Box* (on page 262)

## Reference Element Properties Dialog Box

Sets options for an element you have selected in a reference file.

### See Also

*Configuration Tab* (on page 151)

*General Tab (Reference Element Properties Dialog Box)* (on page 263)

*Insert File* (on page 260)

## **General Tab (Reference Element Properties Dialog Box)**

Reviews and modifies high-level properties that identify an element in a reference file.

### **See Also**

*Reference Attachment File Properties Dialog Box (on page 262)*

## **Translator.ini File Options**

The Translator.ini file provides Smart 3D the measurement units to use when translating files. Translator.ini is divided into the supported graphics file types. Each type section defines separate working units. If you do not modify the units setting in this file, the default output is in meters. After making the necessary changes in the Translator.ini file, save it and republish the project file to observe the log setting changes.

Translator.ini is located in *[Product Folder]\Core\Runtime\SPFSPRB* folder.

The main options provided in the Translator.ini file are described below.

**NOTE** For help in translating AutoCAD files, see *Suggested Conversion Factors for AutoCAD* (on page 265) for recommendations.

### **Master Units**

Possible values for the Master Units field:

Metric Values	Units Denoted
59 =	meters
61 =	millimeters
62 =	centimeters
63 =	kilometers
Imperial Values	Units Denoted
64 =	inches
65 =	feet
66 =	yards
67 =	miles

### **Sub Units**

Possible values for the **Sub Units** field are the same as those for the **Master Units**. The **Sub Units** should be defined the same as the **Master Units** unless the **Positional Units Per Master Unit** are greater than the conversion factor between the defined **Master Unit** and the defined **Sub Unit**. For example, if the **Master Units** are in meters, then the **Sub Units** should also be in meters. If the number of **Positional Units Per Master Unit** is **100**, then the **Sub Units** should

be defined as centimeters. If the number of **positional units per master unit** is **1000**, then the **Sub Units** should be defined as millimeters.

**NOTE** For most situations, the **Sub Units** can be set equal to the **Master Units** to simplify the equation.

### Sub Units Per Master Units

Defines the actual conversion factor between the defined **Sub Units** and **Master Units**. For example, if the **Master Unit** is defined as meters and the **Sub Unit** is defined as centimeters, then this field MUST be defined as **100**. If the **Master Units** and **Sub Units** are set to the same unit type, then the **Sub Units Per Master Units** must be set to **1**.

### NOTES

- To simplify, the **Sub Units** can be set equal to the **Master Units**, and **Sub Units Per Master Units** set to **1**.
- The **Sub Units Per Master Units** field can only have whole integer values (no decimals) of **1** or larger.

### Positional Units Per Sub Unit

Defines the number of positional units in the model dataset that equals a single **Sub Unit**. A positional unit is the smallest whole number (unit of resolution) used to represent model coordinates in the dataset. Modify this value to scale your data as required.

Increase this value to scale your model data to be smaller in terms of the defined **Master Units**. Decrease this value to scale your model data to be larger in terms of the **Master Units**. This field can only have whole integer values (no decimals) of **1** or larger.

### Display Proxy

In AutoCAD, to cancel the proxy translation, add the option below to the AutoCAD section:

```
Display Proxy Entities = 0
```

**NOTE** AutoCAD applications that create proxy objects must be able to export their graphics into a standard AutoCAD file, or into another format that can be read by SmartPlant Review Publisher. Otherwise, the converters cannot read the graphics for display in SmartPlant Review. An example of this is if graphic entities are generated using object enablers. If you have AutoCAD formats that cannot be converted, please contact the application provider for a solution to export the graphics into a readable format.

### Client

Use the setting in this section to support multiple clients. Set the **Client Code** as **SP3D** or **SPRPub** (SmartPlant Review Publisher).

### Global Options

#### Enable Logging

If this option is set to **1**, the software generates the log file in the Temp folder with the name ReaderLogFile.txt. If the option is set to zero (**0**), then no log file is generated.

#### LogSetting

If this option is set to **1**, the software generates a detailed log with the detailed information of

all the graphic objects in the file, such as handle information, color, and layer. If the option is set to **0**, the software only generates a summary of all the graphic objects, such as the number of graphic objects that passed or failed.

## **Suggested Conversion Factors for AutoCAD**

The information below provides suggested metric and imperial conversion factors when using AutoCAD or MicroStation data files. The conversion factor has been commented out.

You can clear the **Acis Conversion Factor** and assign any factor (such as 1.0, or 25.4, or 1000.0)

### **AutoCAD Conversions**

```
AutoCAD source file scaled for kilometers
[AutoCAD Options]
Master Units = 63
Sub Units = 63
Sub Units Per Master Units = 1
Positional Units Per Sub Unit = 1
;Acis Conversion Factor = 1.0 // or 25.4 or 1000.0
AutoCAD source file scaled for centimeters
[AutoCAD Options]
Master Units = 62
Sub Units = 62
Sub Units Per Master Units = 1
Positional Units Per Sub Unit = 1
;Acis Conversion Factor = 1.0 // or 25.4 or 1000.0
AutoCAD source file scaled for meters
[AutoCAD Options]
Master Units = 59
Sub Units = 59
Sub Units Per Master Units = 1
Positional Units Per Sub Unit = 1
;Acis Conversion Factor = 1.0 // or 25.4 or 1000.0
AutoCAD source file scaled for millimeters
[AutoCAD Options]
Master Units = 61
Sub Units = 61
Sub Units Per Master Units = 1
Positional Units Per Sub Unit = 1
;Acis Conversion Factor = 1.0 // or 25.4 or 1000.0
AutoCAD source file scaled for Feet
[AutoCAD Options]
Master Units = 65
Sub Units = 65
Sub Units Per Master Units = 1
Positional Units Per Sub Unit = 1
;Acis Conversion Factor = 1.0 // or 25.4 or 1000.0
AutoCAD source file scaled for Inches
```

```
[AutoCAD Options]
Master Units = 64
Sub Units = 64
Sub Units Per Master Units = 1
Positional Units Per Sub Unit = 1
;Acis Conversion Factor = 1.0 // or 25.4 or 1000.0
```

## Scaling Data Examples

This section lists some examples in setting up the working units and data scaling using the *Translator.ini* file. See *Translator.ini File Options* (on page 263) for a description of the main conversion options provided by the *Translator.ini* file.

### No Scaling Required

If the source data is in known working units, then set up the working units to match those used in the source data.

Source Data: 1 positional unit = 1 mm  
Output: 1 positional unit = 1 mm

#### Settings:

```
Master Units = 61 (mm)
Sub Units = 61 (mm)
Sub Units Per Master Units = 1
Positional Units Per Sub Unit = 1
```

### Keep the Same Working Units But Scale Model Up

You have an AutoCAD file that was originally designed in *millimeters*, but Smart 3D sees all distances scaled to *meters*. To remedy this, you can modify the AutoCAD section in the *translator.ini* file as shown below:

```
[AutoCAD Options]
Master Units = 61
Sub Units = 61
Sub Units Per Master Units = 1
Positional Units Per Sub Unit = 1
```

The number 61 corresponds to millimeters. This tells Smart 3D that all AutoCAD files were originally designed in millimeters and should be converted using the same value.

### Conversion Between Imperial and Metric Unit Systems

The settings below are used by Smart 3D to perform limited conversions between systems. If scaling other than the system conversion is required, adjust either the assumed source unit or adjust the **Positional Units Per Sub Unit** (before rounding), as appropriate.

#### METRIC TO IMPERIAL

Convert from metric to miles to minimize round-off error.

- Source Data: 1 positional unit = 1 m

#### Settings:

Master Units = 67 (mile)  
Sub Units = 67 (mile)  
Sub Units Per Master Units = 1  
Positional Units Per Sub Unit = 1609 (1609.344 m per mi)  
Source Data: 1 positional unit = 1 mm

**Settings:**

Master Units = 67 (mile)  
Sub Units = 67 (mile)  
Sub Units Per Master Units = 1  
Positional Units Per Sub Unit = 1609344 (1609344 mm per mi)

**IMPERIAL TO METRIC**

Convert from imperial to kilometers to minimize round-off errors.

- Source Data: 1 positional unit = 1 ft

**Settings:**

Master Units = 63 (km)  
Sub Units = 63 (km)  
Sub Units Per Master Units = 1  
Positional Units Per Sub Unit = 3281 (3280.839895 ft per km)

- Source Data: 1 positional unit = 1 in

**Settings:**

Master Units = 63 (km)  
Sub Units = 63 (km)  
Sub Units Per Master Units = 1  
Positional Units Per Sub Unit = 39370 (39370.07874 in per km)

## Hyperlink

Adds hyperlinks to selected objects, such as equipment and pipe runs. You can type a link to a file or a web page. Use **Edit > Go to Hyperlink** to follow the hyperlink. If you select an object that does not have a hyperlink associated with it, the **Go to Hyperlink** command is not available.

Hyperlinks are stored in the Site database so that any user working with that object can access them.

### What do you want to do?

- *Insert a hyperlink* (on page 268)
- *Remove a Hyperlink* (on page 268)

## Insert a hyperlink

1. Click the objects that needs a hyperlink.
2. Click **Insert > Hyperlink**.
3. Type the description and URL of the hyperlink.
4. Click **OK**.

### NOTE

- If you are unsure about the URL, click **Browse** to open the **Browse to Address** dialog box.

## Remove a hyperlink

1. Select the object from which you want to remove the hyperlink.
2. Click **Insert > Hyperlink**.
3. Click **Unlink**.

## Insert Hyperlink Dialog Box

Associates a file or Web page with an object in your model. This file or Web page appears when you select the object and click **Edit > Go to Hyperlink**.

### Description

Provides a brief description of the file or Web page associated with the selected object. If the description is longer than the box, you can use the arrow keys to scroll through the text.

### URL

Displays the address of the file or Web page associated with the selected object. You must use the standard **http://**, **file://**, or **www** syntax when defining an address.

### Browse

Searches for and selects the file or Web page you want to associate with the object using the **Browse to Address** dialog box.

### Unlink

Removes the displayed URL from the selected object. This command is not available when the **URL** box is blank.

 **NOTE** When you select a URL using the **Browse to Address** dialog box, the software automatically populates the **Description** box with a default description of the file or Web page. You can keep this default description or type your own.

### See Also

- Browse to Address Dialog Box* (on page 269)
- Insert a hyperlink* (on page 268)

## Browse to Address Dialog Box

Searches for and selects the file or Web page you want to associate to an object in your model using a hyperlink. This dialog box is very similar in use and appearance to a standard web browser application.

### Address List

Specifies the address of a particular web page or file. You can also select a previously entered address and move directly to that address. When you type an address in this box, you must use the standard **http://**, **file://**, or **www** syntax. For example, type **file:///computer/folder/file.txt**. Press **ENTER** to go to the address you typed into this box.

### Back

Returns to the last page you viewed. This button is not active when you first open the dialog box or if no previous addresses are saved in the browser.

### Forward

Moves forward to a page you viewed before you clicked **Back**. This button is not available unless your last command was clicking the **Back** button.



### Stop

Ends any command the software is performing. Click this button if a page is taking too long to load.



### Refresh

Displays the latest version of a page.



### Home

Opens the Web page defined as the starting page of your browser.



### Search

Opens a standard search tool to help you find the page you want.



### Favorites

Adds a location to saved list of pages, views your list of saved pages, or opens a saved page from that list.

### Select

Associates the displayed location with the object selected in your model.

### See Also

*Insert a hyperlink* (on page 268)  
*Insert Hyperlink Dialog Box* (on page 268)

## Note

Adds notes to objects, such as equipment and pipe parts. You can type special instructions or requirements related to a given component for the fabricator.

When you select the **Note** command, you are prompted to select a key-point, insertion point, tap point, or control point. Notes are associated with individual component key points and can be used with many objects in the software, including instruments, pipe, piping components, specialty items, pipe support assemblies, HVAC fittings, and cableway fittings. The software associates notes with parts, not features.

Notes contain user-definable text that provides special instructions or requirements for a given component. Notes are a form of communication with the fabricator of the system.

The software associates notes with parts, not features. To view the properties of notes, select an object with corresponding notes and use the **Properties** command on the **Edit** menu. When you create a note, you can include a hyperlink in the **Note text** box. The **Edit Properties** dialog box includes a **Notes** tab after you have added a note. For more information, see *Notes Tab* (on page 181).

---

### What do you want to do?

- *Insert a note* (on page 270)
- *Follow a note* (on page 271)
- *Insert a note at a precise place on an isometric drawing* (on page 271)

---

## Insert a note

1. Click the object that needs a note.
2. Click **Insert > Note**.
3. Select a key point, insertion point, tap point, or control point for associating the note.
4. In the **Key point** box, select a point to which to attach the note.
5. In the **Note name** box, type or select a name.
6. In the **Purpose of note** box, select a purpose.
7. In the **Note text** box, type descriptive text about the note.

 **NOTE** Notes are stored in the Site database so any user working with that object can access them.

## Follow a note

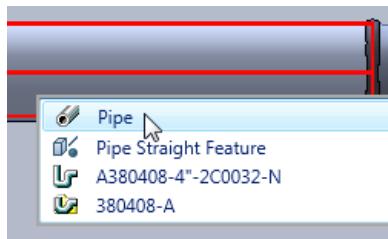
1. Select an object with an associated note.
2. Click **Edit > Properties** to access the **Properties** dialog box for the object.
3. Change to the **Note** tab to view the note text and other properties on the **Notes** tab.

**TIP** You can add or delete notes using the buttons on the **Notes** tab.

## Insert a note at a precise place on an isometric drawing

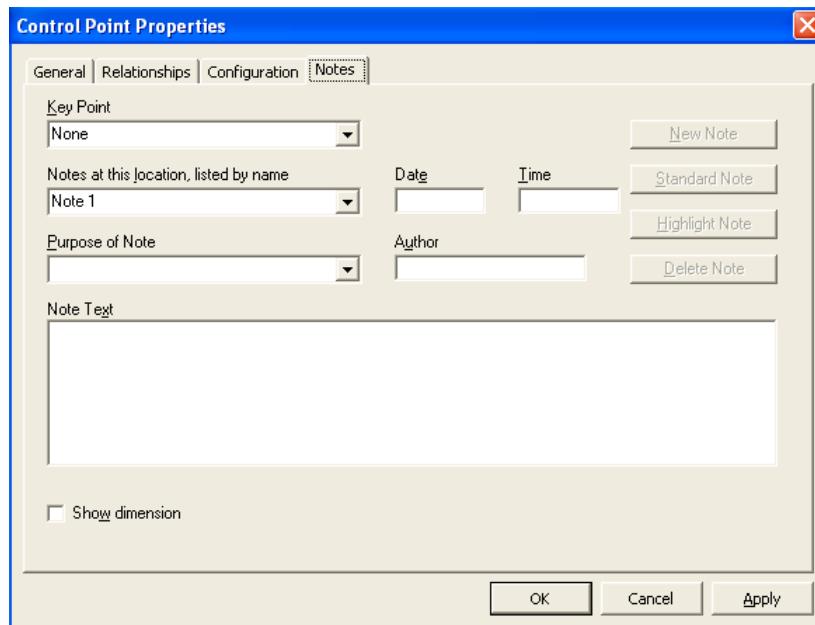
1. Select **Insert > Control Point**.
2. Select the pipe part in the model that needs a note.

**TIP** Use the quick pick tool to make the correct selection.



3. Position the control point on the centerline of the pipe part. For precision placement, use commands like **Measure**, **PinPoint**, or **Point Along**.
4. In the **Type** box, verify that **Control Point** is selected.
5. Confirm or change the option in the **Subtype** box on the ribbon.
6. In the **Name** box, define a name for the control point.
7. Click **Properties**.
8. Under the **Notes** tab, click **New Note**.
9. In the **Key point** box, select the control point to which to attach the note.
10. In the **Notes at this location, listed by name** box, type or select a name.
11. In the **Purpose of note** box, select **Fabrication** so that the note is picked up for inclusion in the drawing.
12. In the **Note text** box, type descriptive text for the note.

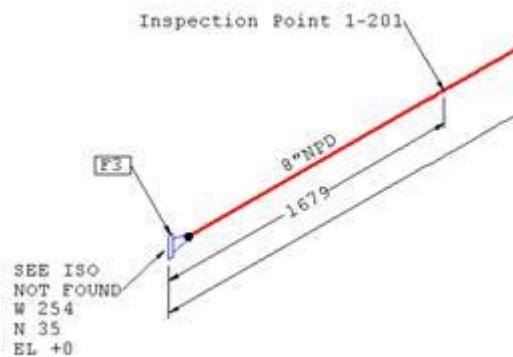
13. Check the **Show dimension** box if you want a dimension to appear on the drawing.



14. Click **OK**.

15. In the Drawings and Reports task, use the **Update Now** or **Batch > Update** commands to update the drawing that includes the pipe part with the associated control point.

*The note appears where it was placed in the model.*



## Insert Note Dialog Box

Associates a note with a selected object.

### Key point

Indicates the specific location on a component to which the note is associated. The list lets you select up to three key points.

### Note name

Displays the name of the note to associate with the selected object.

### Purpose of note

Describes the reason you want to associate a note with the selected object. A list provides a variety of purposes you can choose for your note.

### Note text

Specifies a text message for the note. You can use this space to provide special instructions or requirements related to the given component for the fabricator. You can also use this space to make comments.

### Show dimension

This option is not used in the current version of the software.

### See Also

*Insert a note at a precise place on an isometric drawing (on page 271)*

*Insert a note (on page 270)*

*Note (on page 270)*

## Control Point

Inserts a control point on an object in the model. The software translates the control point on volume and composed drawings and depicts its own symbol and coordinate callout. If part of an assembly, the control point controls the location of the drawing leader line for that assembly. When a control point is inserted, it is added to the **System** hierarchy in the **Workspace Explorer** beneath the system and object to which it is associated.

The Drawings and Reports task uses control points for the following reasons:

- To drive coordinate and label locations.
- To generate notes on volume and composed drawings, isometric drawings, and reports.
- To use as a reference for dimensioning schemes based on a monument, or coordinate system, and to give directions for the dimensions. You can define coordinate systems and monuments in the Grids task.

You define the location of a control point with the **Insert > Control Point** command. You designate the control point relative to a parent object, such as along a centerline or on a surface. Examples of parent objects are route objects, equipment, structures, grids, and coordinate systems. If you delete the parent object, the software also deletes the control point.

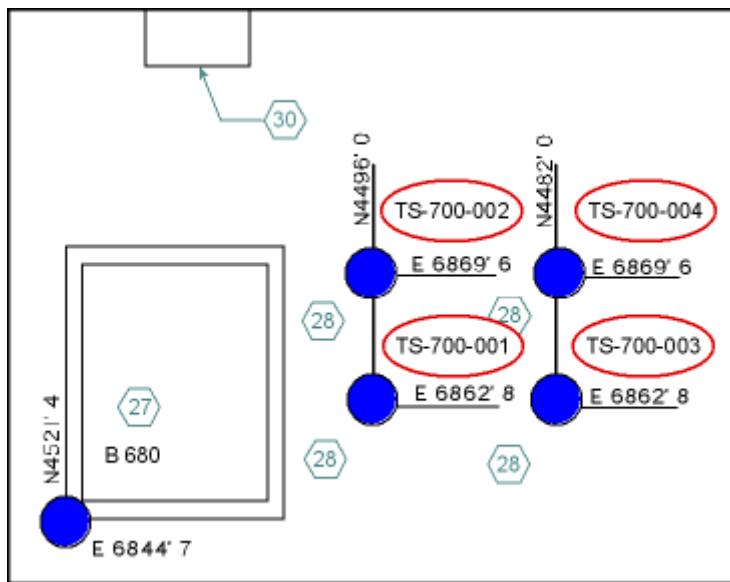
The parent object drives the relationship of the control point as part of an assembly. That is, the control point and its parent object share the same relationships. The control point and parent object also are in the same permission group and have the same approval status. While you can assign multiple control points to a parent object, each control point has only one parent object.

You can use the SmartSketch relationship indicators or commands like **Measure** , **PinPoint** , and **Point Along** to define an associative position, setting the control point as a child object to the associative point constraint that locates the exact position. For example, you can place a control point two meters from a key point along a pipe. During a move or modification, the software maintains the control point location at the same distance from the key point. Therefore, if you modify the pipe length, the control point remains at two meters from the key point. If you modify the pipe length to equal less than two meters, the software automatically deletes the point.

The software does not contain a filter for control points; however, you can select a control point in the model by applying the **All** locate filter and then clicking the **Select** command. You can also select a control point from the **Workspace Explorer** if the filter is set to **All**.

Definitions for drawing filters and rules control the symbolization of control points. The location of the control point symbol corresponds to the 3D control point.

The following graphic depicts five control points that are positioned near labels in a P&ID:



## NOTES

- The control point is not a physical object and does not support interference checking.
- A control point is a 3D graphic object with properties that represents a point in the model. The software translates the object on volume and composed drawings and depicts its own symbol and coordinate callout. If part of an assembly, the control point controls the location of the drawing leader line for that assembly.
- A monument is an object, such as a post or stone, fixed in the ground to mark a boundary or position. A coordinate system defines a monument to provide measurement directions.
- A key point is any point that you can locate on a symbol or an object.
- If a control point is not defined for a symbol, the default control point is the center of the symbol.
- Each piece of equipment must have at least one control point.

- When you insert a control point, you can specify a control point subtype to provide a further breakdown for the type of control point. To customize subtypes, you can use the functionality in the Catalog task. Possible subtypes are **Process Equipment**, **Mechanical Equipment**, **Foundation**, **Structure**, **Pipe Mfg Limit Point**, **Spool Break**, **Duct Break Point**, **WBS Pipe Break - Fabrication**, **WBS Break Point Type 1**, **WBS Break Point Type 2**, **WBS Break Point Type 3**, **WBS Break Point Type 4**, **WBS Pipe Break - Stress**, **WBS Break Point Type 5**, **WBS Pipe Break - Tracing**, **WBS Pipe Break - Generic**, **WBS Pipe Break - System**, **Elevation Callout**, **Ad Hoc Note**, **CAD Detail**, and **Key Plan Callout**. You can use the control point subtypes to classify the control point for use in the Drawings and Reports task. For more information, see *Control Point Subtype Sheet* in the *Reference Data Guide* available from the **Help > Printable Guides** command in the software.
- The **Control Point** placement allows you to select a parent object and a placement point. The placement point can be defined on an existing geometric object that creates a physical constrain (Assoc Point) to that object. For best results, make sure that the selected geometric object is a child of the selected control point parent object. If this practice is not followed, you might experience unexpected results when control point parent or that geometry is independently modified. This unexpected behavior can be caused by **Move**, **Copy/Paste**, **Model Data Reuse** or the **Model Data Transform** commands. If these objects are moved or copied, the control point might get disconnected from the selected geometric object or disappear if parent is deleted.
- By default, the size of a control point is 100 mm. You can change the size using the **Control Points Properties** dialog box, if required.
- To insert control points having different diameters, modify the properties when inserting the control point. In these cases, the inserted control point within the session gets the changed diameter until it is again changed for the insertion of another control point.
- If you select an object (for example, Equipment) before inserting a control point, then the selected object becomes the parent of control point, and the software prompts you for positioning the control point.
- The control points are inserted in the **Reference Geometry** aspect.

**TIP** Click **Format > View > Display > Selected Aspects > Reference Geometry** aspect to view the control point in different session.

### Control Point Ribbon (Placement)

Provides options to identify a parent object and precisely place a control point in the model. Use the **Measure** , **PinPoint** , and **Point Along** commands to help locate the point or surface.

#### **Properties**

Displays the control point properties.

#### **Select Parent Object**

Selects an object associated with the control point.

#### **Select Point Location**

Allows you to click in the model to specify the location of the control point.

### Type

Specifies the appropriate category of point. You choose an option from a select list. The

**Catalog** task is the primary tool for defining select lists. For more information, see the *Catalog User's Guide* available from the **Help > Printable Guides** command in the software.

#### Subtype

Provides a further breakdown for the type of control point. As in the **Type** box, you choose an option from a select list. Possible subtypes are **Process Equipment**, **Mechanical Equipment**, **Foundation**, **Structure**, **Pipe Mfg Limit Point**, **Spool Break**, **Duct Break Point**, **WBS Pipe Break - Fabrication**, **WBS Break Point Type 1**, **WBS Break Point Type 2**, **WBS Break Point Type 3**, **WBS Break Point Type 4**, **WBS Pipe Break - Stress**, **WBS Break Point Type 5**, **WBS Pipe Break - Tracing**, **WBS Pipe Break - Generic**, **WBS Pipe Break - System**, **Elevation Callout**, **Ad Hoc Note**, **CAD Detail**, and **Key Plan Callout**.

#### NOTES

- You can use control point subtypes to classify the control point for use in drawings and reports. For more information, see *Control Point Subtype Sheet* in the *Reference Data Guide* available from the **Help > Printable Guides** command in the software.
- Control point subtypes are used in drawings in several ways. They can indicate a point on a piece of equipment or a structure to be used in dimensioning. The subtype can indicate the position of a grating symbol on a structure planning drawing. Another way the subtype is used is to place notes at a very specific point on an object, making the control point drawable so it can be labeled.
- You can use the CAD Detail control point subtype to classify the control point for use in the HgrSup3View package in drawings and reports. For more information, see the *Smart 3D Drawings and Reports Reference Data Guide*.

#### Name

Identifies the control point with a name, which you can define, or use the selection that a rule defines. The **GenericNamingRules.xls** workbook lists the naming rules used in the software. For more information about naming rules, see the *Reference Data Guide* available from the **Help > Printable Guides** command in the software.

#### Control Point Ribbon (Edit)

Provides options to view and edit a control point in the model.

##### Properties

Displays the control point properties.

##### Parent object

Specifies an object associated with the control point. You can select from the last five parent objects. You can also click **Select Graphically** to select an object in a graphic view, or click **More** to select an object from a tree view.

##### Type

Specifies the appropriate category of point. You choose an option from a select list. The **Catalog** task is the primary tool for defining select lists. For more information, see the *Catalog User's Guide* available from the **Help > Printable Guides** command in the software.

##### Subtype

Provides a further breakdown for the type of control point. As in the **Type** box, you choose an option from a select list. Possible subtypes are **Process Equipment**, **Mechanical Equipment**, **Foundation**, **Structure**, **Pipe Mfg Limit Point**, **Spool Break**, **Duct Break Point**, **WBS Pipe Break - Fabrication**, **WBS Break Point Type 1**, **WBS Break Point Type 2**, **WBS Break Point Type 3**, **WBS Break Point Type 4**, **WBS Pipe Break - Stress**, **WBS Break Point Type 5**, **WBS Pipe Break - Tracing**, **WBS Pipe Break - Generic**, **WBS Pipe Break - System**, **Elevation Callout**, **Ad Hoc Note**, **CAD Detail**, and **Key Plan Callout**.

## ■ NOTES

- You can use control point subtypes to classify the control point for use in drawings and reports. For more information, see *Control Point Subtype Sheet* in the *Reference Data Guide* available from the **Help > Printable Guides** command in the software.
- Control point subtypes are used in drawings in several ways. They can indicate a point on a piece of equipment or a structure to be used in dimensioning. The subtype can indicate the position of a grating symbol on a structure planning drawing. Another way the subtype is used is to place notes at a very specific point on an object, making the control point drawable so it can be labeled.

### Name

Identifies the control point with a name, which you can define, or use the selection that a rule defines. The **GenericNamingRules.xls** workbook lists the naming rules used in the software. For more information about naming rules, see the *Reference Data Guide* available from the **Help > Printable Guides** command in the software.

### E

Displays the coordinate of the control point along the E-axis (East).

### N

Displays the coordinate of the control point along the N-axis (North).

### EL

Displays the coordinate of the control point along the EL-axis (Elevation).

---

## What do you want to do?

- *Add control points* (on page 278)
- *Edit control points* (on page 278)
- *Set isometric break control points for drawings* (on page 278)
- *Add location point coordinates to PCF* (on page 279)
- *Indicate elevation on drawings* (on page 280)
- *Add Ad Hoc Note to control points for drawings* (on page 282)
- *Add CAD details of a support component in the drawings* (on page 283)
- *Add the location coordinates of the key plan to drawings* (on page 286)

---

## Add control points

1. Select **Insert > Control Point**.
2. To set an association, designate the parent object for the control point or identify a location in the model. To identify a precise location in the model, use commands like **Measure**, **PinPoint**, and **Point Along**.
3. Confirm or change the option in the **Type** box on the ribbon.
4. Confirm or change the option in the **Subtype** box on the ribbon.
5. Confirm or change the assigned phrase in the **Name** box on the ribbon. If you have defined a naming rule to assign the name for the control point, you can use that selection.

**NOTE** Using the **Format View** dialog box, you can see the control point placed in the model by selecting **Reference Geometry** from the **Selected Aspects** list.

## Edit control points

1. Select a control point in the model.

**TIPS**

- Using the **Format View** dialog box, you can see the control point in the model by selecting **Reference Geometry** from the **Selected Aspects** list.
- You can use **QuickPick** and a locate filter to assist in selection of control points.

2. On the ribbon, specify a parent in the **Parent Object** box. You can choose from the last five parent objects, or you can select an object graphically in the model or from a tree view.
3. Confirm or change the option in the **Type** box on the ribbon.
4. Confirm or change the option in the **Subtype** box on the ribbon.
5. Confirm or change the assigned phrase in the **Name** box on the ribbon.

### NOTES

- Click **Properties** on the ribbon to view or edit additional properties of the control point.
- You can view the coordinates of the control point in the boxes on the ribbon. However, you cannot edit these coordinates.

## Set isometric break control points for drawings

The following procedure provides an example for setting an isometric break control points so that a drawing is split according to the break points.

1. In the Piping task, place a flange on a pipeline.
2. Select **Insert > Control Point**.
3. Set the **subtype** for the control point to **PipingMfg Limit Point**.

**NOTE** Make sure the parent of the control point is a **Route Connection** object.

4. Go to the Drawings and Reports task and update the drawing for the pipeline.

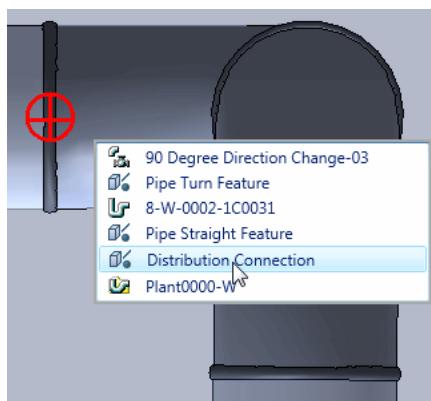
The updated drawing should have two sheets. The Piping Component File (PCF) should have the line ISO-SPLIT- POINT followed by the x, y, and z coordinates of the isometric break control point.

**NOTE** You can create rules to use the control point subtypes to classify the control point for use in drawings and reports. For more information, see *Control Point Subtype Sheet* in the *Smart 3D Reference Data Guide* available from the **Help > Printable Guides** command in the software.

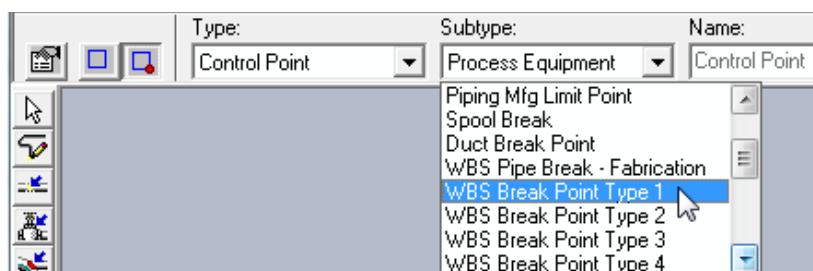
## Add location point coordinates to PCF

This procedure provides an example for setting a control point so that a drawing Piping Component File (PCF) includes location point coordinates (units in millimeters).

1. Go to the Piping task.
2. Select **Insert > Control Point**.
3. Select the **Distribution Connection** as the parent for the control point.

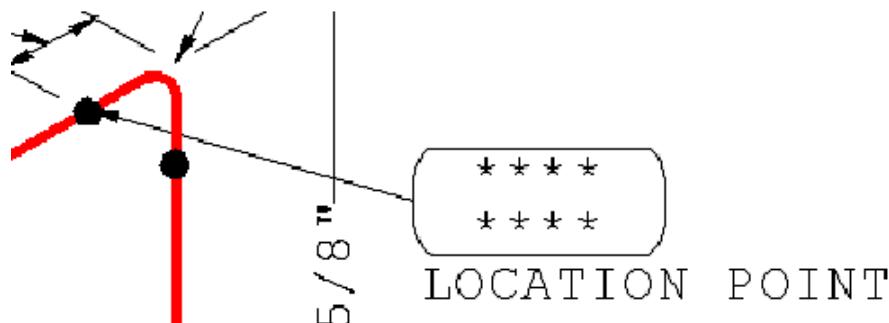


4. Select **WBS Break point Type 1** from the **Subtype** list.



5. Place the control point as a location point for the drawing and PCF. For example, you might want to place it on a weld.
6. Update the drawing for the pipeline.

The updated drawing shows a label for the Location Point that has a label pointing to the Distribution Connection.



The Piping Component File (PCF) includes the line LOCATION-POINT followed by the x, y, and z coordinates (units in millimeters) of the control point.

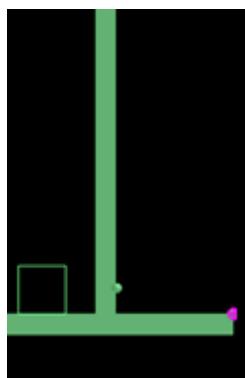
<b>LOCATION-POINT</b>			
CO-ORDS	114.842	1696.388	4667.764
SKEY	LOPT		

**NOTE** You can create rules to use the control point subtypes to classify the control point for use in drawings and reports. For more information, see *Control Point Subtype Sheet* in the *Smart 3D Reference Data Guide* available from the **Help > Printable Guides** command in the software.

## Indicate elevation on drawings

The following procedure provides an example for setting a control point to indicate the elevation of the control point labeled on the drawings.

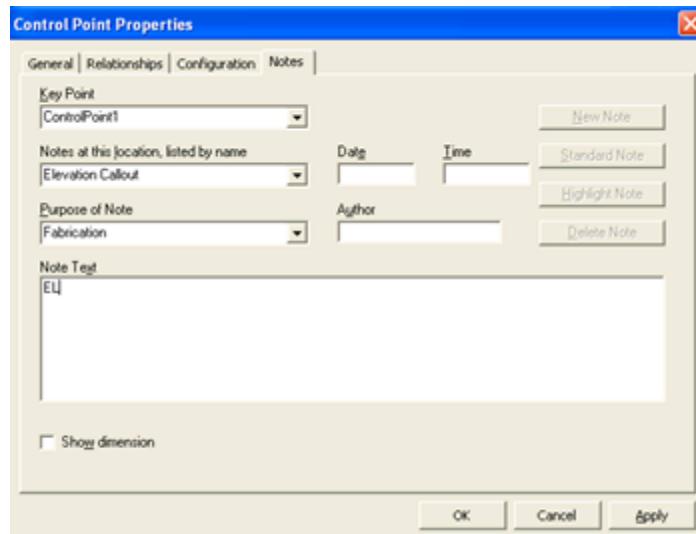
1. In the Hangers and Supports task, place a control point on the support. Select **Insert > Control Point**.



2. Select the parent object for the control point.
3. Set the **Subtype** for the control point to **Elevation Callout**.

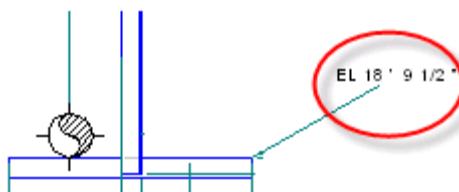


4. Create a note associated with the control point. The text of the note is appended to the label before the elevation.
  - a. Open the **Control Point Properties** dialog box for the control point.
  - b. Click the **Notes** tab.
  - c. Click **New Note**.
  - d. Specify the **Key Point**, in this example *ControlPoint1*, to add the note, specify *Elevation Callout* for **Notes at this location, listed by name**, select *Fabrication* for **Purpose of Note**, and specify *EL* for **Note Text**.



5. Go to the Drawings and Reports task and update the drawing for the structure.

*The updated drawing shows a label that has the elevation value of the control point location and the note added.*

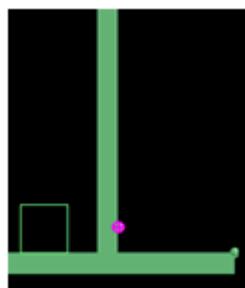


**NOTE** You can create rules to use the control point subtypes to classify the control point for use in drawings and reports. For more information, see *Control Point Subtype Sheet* in the *Smart 3D Reference Data Guide* available from the **Help > Printable Guides** command in the software.

## Add Ad Hoc Note to control points for drawings

The following procedure provides an example for setting a control point to have an ad hoc note on the drawings.

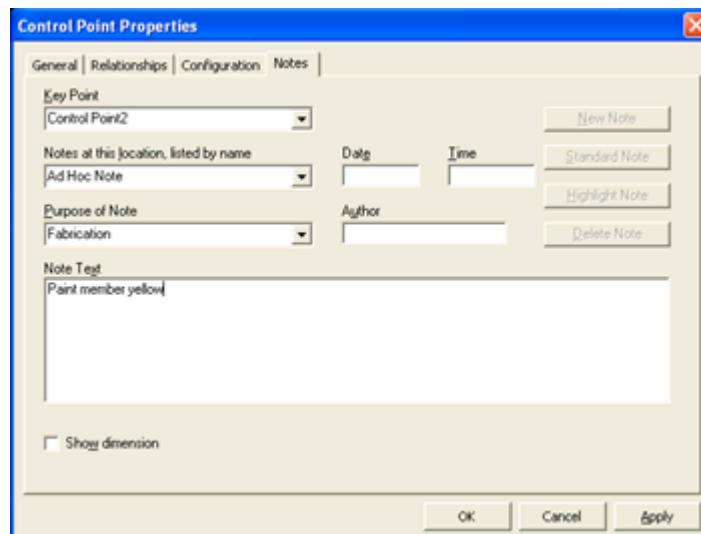
1. In the Hangers and Supports task, place a control point on the support. Select **Insert > Control Point**.



2. Select the parent object for the control point.
3. Set the **Subtype** for the control point to **Ad Hoc Note**.

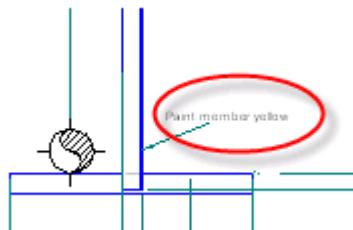


4. Create a note associated with the control point.
  - a. Open the **Control Point Properties** dialog box for the control point.
  - b. Click the **Notes** tab.
  - c. Click **New Note**.
  - d. Specify the **Key Point**, in this example *Control Point2*, to add the note, specify *Ad Hoc Note for Notes at this location, listed by name*, select *Fabrication* for **Purpose of Note**, and specify *Paint member yellow* for **Note Text**.



5. Go to the Drawings and Reports task and update the drawing for the structure.

The updated drawing shows a label with the note added at the control point location.



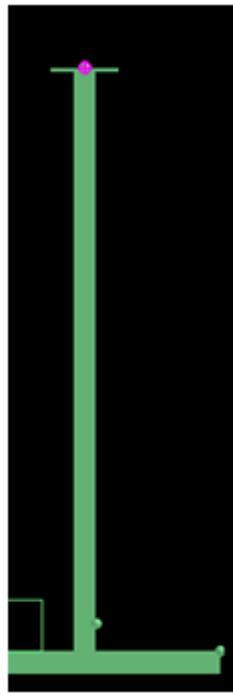
**NOTE** You can create rules to use the control point subtypes to classify the control point for use in drawings and reports. For more information, see *Control Point Subtype Sheet* in the *Smart 3D Reference Data Guide* available from the **Help > Printable Guides** command in the software.

## Add CAD details of a support component in the drawings

When using the **HngSup-CAD Details** view style, you can place the CAD details (.sym file) in the drawings. You must specify the location of the .sym file in the **Note Text** field in the **Notes** tab of the **Control Point Properties** dialog box for the control point.

The following procedure provides an example for setting a control point to place the CAD details on the drawings.

1. In the Hangers and Supports task, place a control point on a support component. Select **Insert > Control Point**.

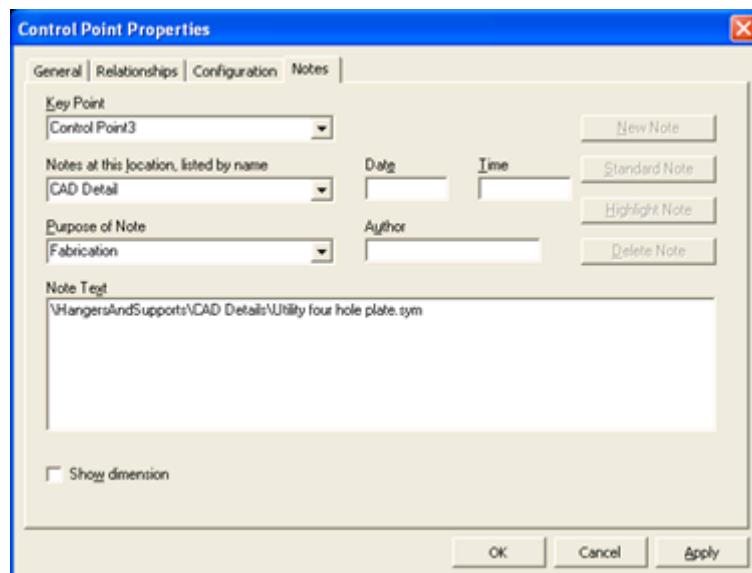


2. Select the parent object for the control point.

3. Set the **Subtype** for the control point to **CAD Detail**.



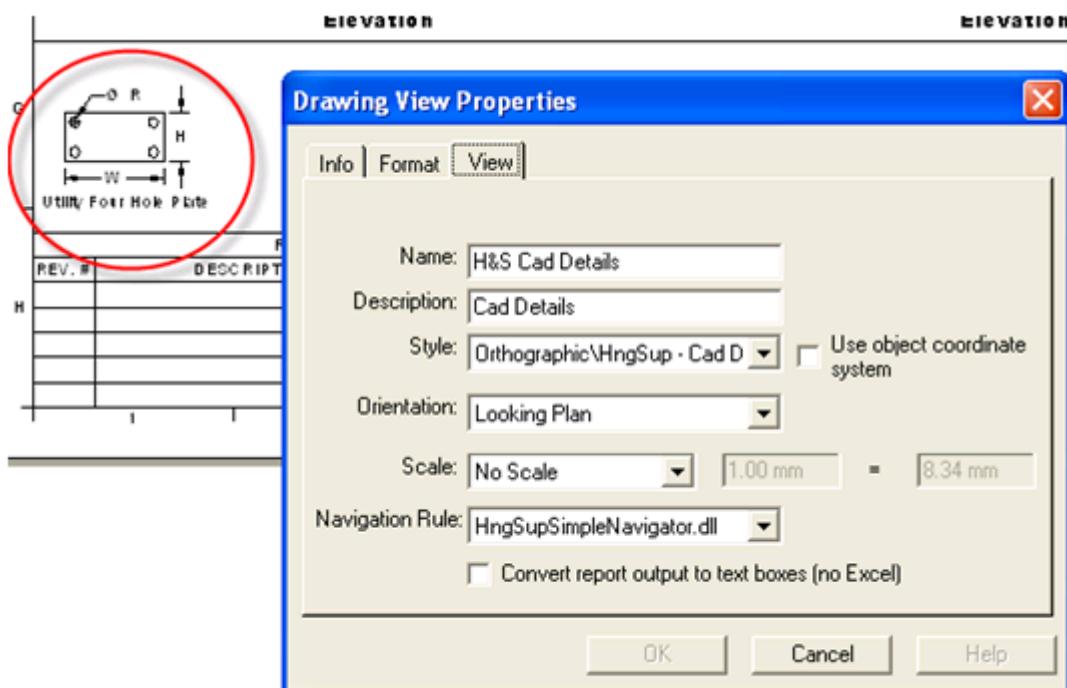
4. Create a note associated with the control point, specifying the location of the .sym file.
  - a. Open the **Control Point Properties** dialog box for the control point.
  - b. Click the **Notes** tab.
  - c. Click **New Note**.
  - d. Specify the **Key Point**, in this example *Control Point3*, to add the note, specify *CAD Detail* for **Notes at this location, listed by name**, select *Fabrication* for **Purpose of Note**, and specify *\HangersAndSupports\CAD Details\Utility four hole plate.sym* for **Note Text**.



5. Go to the Drawings and Reports task and update the drawing for the support component.

*The updated drawing shows the graphic detail of the associated control point note text in the*

view, where the **HngSup – CAD Details** view style is activated.



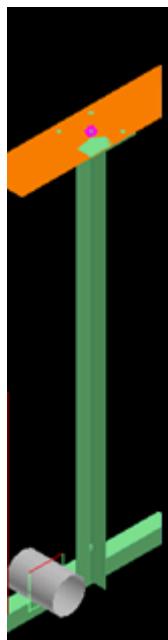
**NOTE** You can create rules to use the control point subtypes to classify the control point for use in drawings and reports. For more information, see *Control Point Subtype Sheet* in the *Smart 3D Reference Data Guide* available from the **Help > Printable Guides** command in the software.

## Add the location coordinates of the key plan to drawings

You can indicate the location coordinate of the key plan on the drawings. By default, the location coordinate of the key plan refers to the primary pipe centerline. You can change it by specifying a **Key Plan Callout** subtype for the control point.

The following procedure provides an example for setting a control point to add the key plan coordinates on the drawings.

1. In the Hangers and Supports task, place a control point on a support component. Select **Insert > Control Point**.

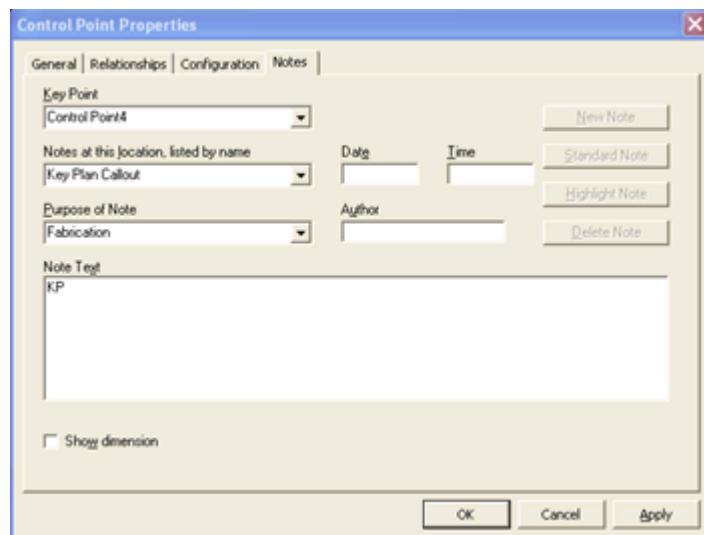


2. Select the parent object for the control point.
3. Set the **Subtype** for the control point to **Key Plan Callout**.



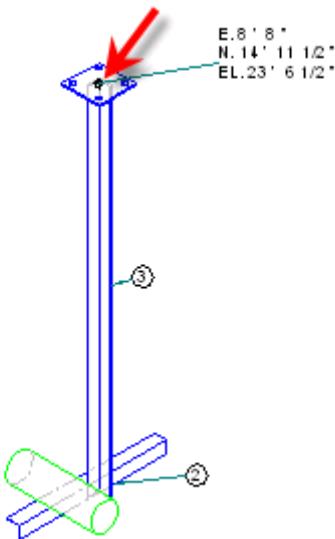
4. Create a note associated with the control point.
  - a. Open the **Control Point Properties** dialog box for the control point.
  - b. Click the **Notes** tab.
  - c. Click **New Note**.

d. Specify the **Key Point**, in this example *Control Point4*, to add the note, specify *Key Plan Callout* for **Notes at this location, listed by name**, select *Fabrication* for **Purpose of Note**, and specify *KP* for **Note Text**.



5. Go to the Drawings and Reports task and update the drawing for the support component.

*The updated drawing shows the Key Plan coordinate label at the specified control point location in the drawing.*



**NOTE** You can create rules to use the control point subtypes to classify the control point for use in drawings and reports. For more information, see *Control Point Subtype Sheet* in the *Smart 3D Reference Data Guide* available from the **Help > Printable Guides** command in the software.

## Control Point Properties Dialog Box

Sets options for a selected control point.

**NOTE** When you open the **Control Point Properties** dialog box during the initial placement of a control point, only the **General** tab is visible. The remaining tabs display only when you are editing an existing control point.

*General Tab (Control Point Properties Dialog Box)*

*Relationship Tab (on page 182)*

*Configuration Tab (on page 151)*

*Notes Tab (on page 181)*

### **General Tab (Control Point Properties Dialog Box)**

Displays and defines the general properties of the selected control point.

#### **Category**

Select the type of properties that you want to view for the selected control point. Control point properties have only one category: **Standard**.

#### **Control Point Type**

Specifies the appropriate category of point. You select an option from the list. Catalog is the primary tool for defining select lists. For more information, see the *Catalog User's Guide* available from the **Help > Printable Guides** command in the software.

#### **Control Point Subtype**

Provides a further breakdown for the type of control point. As in the **Type** box, you choose an option from a select list. Possible subtypes are **Process Equipment**, **Mechanical Equipment**, **Foundation**, **Structure**, **Pipe Mfg Limit Point**, **Spool Break**, **Duct Break Point**, **WBS Pipe Break - Fabrication**, **WBS Break Point Type 1**, **WBS Break Point Type 2**, **WBS Break Point Type 3**, **WBS Break Point Type 4**, **WBS Pipe Break - Stress**, **WBS Break Point Type 5**, **WBS Pipe Break - Tracing**, **WBS Pipe Break - Generic**, **WBS Pipe Break - System**, **Elevation Callout**, **Ad Hoc Note**, **CAD Detail**, and **Key Plan Callout**.

**NOTE** You can use the control point subtypes to classify the control point for use in drawings and reports. For more information, see *Control Point Subtype Sheet* in the *Smart 3D Reference Data Guide* available from the **Help > Printable Guides** command in the software.

#### **Name**

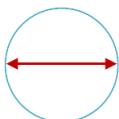
Specifies the name of the object. If a **Name Rule** is specified, then the software uses that rule to determine this name. If the **Name Rule** value is **User Defined**, then you must type a name in this box. The **GenericNamingRules.xls** workbook lists the naming rules used in the software. For more information about naming rules, see the *Smart 3D Reference Data Guide* available from the **Help > Printable Guides** command in the software.

#### **Naming Rule**

Displays the available name rules for the selected object. Specify the naming rule to use to name the object. You can select one of the listed rules, or you can select **User Defined** to specify the name yourself in the **(Name)** box.

**Diameter**

Displays the diameter of the object.

**Parent Object**

Specifies the object to which the control point is associated.

**Associativity**

Sets the associativity of the control point. You can select **True** or **False**.

**E**

Displays the coordinate of the control point along the E-axis (East).

**N**

Displays the coordinate of the control point along the N-axis (North).

**EL**

Displays the coordinate of the control point along the EL-axis (Elevation).

## Construction Graphics

Construction graphics include **Lines** , **Line strings** , **Arcs** , **Circles** , and **Rectangles**

Construction graphics can represent any object that you have not yet placed but that must interact with other designed objects. The graphics can also substitute for edges or centerlines for objects that you cannot place because of permissions. Alternately, construction graphics can serve as guidelines for design procedures that you cannot represent using SmartSketch 3D.

Construction graphics are organized in the system hierarchy. You can place construction graphics in all systems, except for Pipeline systems. You can create a system in the Systems and Specifications task or in the **Workspace Explorer**. The software automatically names and groups construction graphics underneath the selected system in the **Workspace Explorer**.

Construction graphics display initially with standard solid lines. However, you can use surface style rules to modify the appearance and color of the lines.

Construction graphics are not included in view styles and do not display in volume orthographic drawings without the customization of view styles. Additionally, you cannot associate placed objects with construction graphics. For example, you cannot "lock" an object to a construction graphic to move the object and the graphic together.

**NOTE** Interference Detection does not check construction graphics.

Construction graphics are not physical objects. Therefore, although construction graphics are saved in the model, graphics placed in a previous session are not automatically visible when you next open the session. To view previously placed construction graphics, you must turn on Reference Geometry by selecting Format > View. Under Selected Aspects, select Reference

Geometry. The software automatically turns on Reference Geometry when you place construction graphics in the current session.

## Construction Graphics Ribbon

Provides options for placing construction graphics to represent objects that you have not yet placed in the model.

### System

Selects the system under which the graphics are grouped.

### Graphic Type

Displays graphic options. Select from the **Line** , **Line String** , **Arc** , **Circle** , and **Rectangle**  commands.

### Plane

Selects the plane on which to place the selected construction graphic. Select from

**Plane/Elevation View** , **East-West Plane** , **North-South Plane** , and **No Plane** .

### Point

When used with the **Line**  and **Line String**  commands, **Point** specifies the **Start point**  or **End point**  of the selected construction graphic. The **Draw** command also allows you to specify points when placing other construction graphics, as described below.

### Draw

Designates specific points by which to place the selected construction graphic. Select point options from a list.

These options are specific to the **Arc** , **Circle** , and **Rectangle**  commands.

#### Arc

**By 3 points** allows you to place an arc by specifying three points of reference. Use the **Define start point of arc** , **Define point on arc** , and **End point of arc**  commands to draw the arc.

**By Center** allows you to place an arc by specifying a central point of reference. Use the **Center of arc** , **Define start point of arc** , and **End point of arc**  commands to draw the arc.

#### Circle

**By 3 points** allows you to place a circle by specifying three points of reference. Use the **Define first point on circle** , **Define second point on circle** , and **Define third point on circle**  commands to draw the circle.

**By Center** allows you to place a circle by specifying a central point of reference. Use the **Center of Circle**  and **Point on Circle**  commands to draw the circle.

#### Rectangle

**By 3 points** allows you to place a rectangle by specifying three points of reference. Use the **First vertex of rectangle** , **Second vertex of rectangle** , and **Define height by point of rectangle**  commands to draw the rectangle.

**By 2 points and direction** allows you to place a rectangle by specifying the point of direction. Use the **Select point of direction** , **First vertex of diagonal** , and **Second vertex of diagonal**  commands to draw the rectangle.

#### Finish

Ends a line string that you have just placed. This action is only available with the **Line String**  command.

#### Name

Defines a name for the construction graphic that you have just placed.

#### Close

Closes the ribbon and returns you to the main window.

---

### What do you want to do?

- [Place a line \(on page 291\)](#)
- [Place continuous line segments \(on page 292\)](#)
- [Place a line string \(on page 292\)](#)
- [Place an arc by three points \(on page 293\)](#)
- [Place an arc by center \(on page 293\)](#)
- [Place a circle by three points \(on page 294\)](#)
- [Place a circle by center \(on page 294\)](#)
- [Place a rectangle by three points \(on page 295\)](#)
- [Place a rectangle by two points and direction \(on page 295\)](#)

---

## Place a line

1. Select **Insert > Construction Graphics**.
2. Select **More...** in the **System** option.
3. Select the system under which you want to group the construction graphics.
4. Click **OK**.

5. Click **Line**  under **Graphic Type** on the Construction Graphics ribbon.

6. Click **Start Point** .

7. Click in the graphic view, and drag the cursor to extend the line.

**NOTE** The default plane behavior is **No Plane**. To place the graphic along a plane, select the plane from the **Plane** option.

8. Click one time to end the line.
9. Click again anywhere in the view to draw another line.
10. Click **Close** to exit the command.

**TIP** You can draw lines in any direction that you want.

## Place continuous line segments

1. Select **Insert > Construction Graphics**.
2. Select **More...** in the **System** option.
3. Select the system under which you want to group the construction graphics.
4. Click **OK**.
5. Click **Line**  under **Graphic Type** on the Construction Graphics ribbon.
6. Click **Start Point** .
7. Click in the graphic view to begin drawing the line.

**NOTE** The default plane behavior is **No Plane**. To place the graphic along a plane, select the plane from the **Plane** option.

8. Drag the cursor in the direction in which you want to draw the line. To change direction, click **End Point** .

*The line automatically begins again at the end point of the previous line segment.*

9. Drag the cursor to draw the continuous line segments, changing direction as required.
10. Click **Close** to exit the command.

## Place a line string

1. Select **Insert > Construction Graphics**.
2. Select **More...** in the **System** option.
3. Select the system under which you want to group the construction graphics.
4. Click **OK**.
5. Click **Line string**  under **Graphic Type** on the Construction Graphics ribbon.
6. Click **Start Point** .
7. Click in the graphic view to begin placing the line. Then, drag the cursor in the direction that you want to draw the line, changing direction as required.

**NOTE** The default plane behavior is **No Plane**. To place the graphic along a plane, select the plane from the **Plane** option.

*The line automatically follows the cursor as you click.*

8. When you have drawn the line, click **Finish**.

**NOTE** The **Line string**  command allows you to select the entire line string, instead of line segments. To select only segments of a line, use the **Line**  command.

## Place an arc by three points

1. Select **Insert > Construction Graphics**.
2. Select **More...** in the **System** option.
3. Select the system under which you want to group the construction graphics.
4. Click **OK**.
5. Click **Arc**  under **Graphic Type** on the Construction Graphics ribbon.  
**NOTE** The default plane behavior is **No Plane**. To place the graphic along a plane, select the plane from the **Plane** option.
6. Select **By 3 point** from the **Draw** option.
7. Click in the graphic view to place the start point  of the arc.  
**NOTE** The default plane behavior is **No Plane**. To place the graphic along a plane, select the plane from the **Plane** option.
8. Click again in the graphic view to designate the center point  of the arc.
9. Click a final time in the graphic view to designate the end point  of the arc.
10. Click **Close** to exit the command.

## Place an arc by center

1. Select **Insert > Construction Graphics**.
2. Select **More...** in the **System** option.
3. Select the system under which you want to group the construction graphics.
4. Click **OK**.
5. Click **Arc**  under **Graphic Type** on the Construction Graphics ribbon.
6. Select **By center** from the **Draw** option.
7. Click in the graphic view to place the center point  of the arc.  
**NOTE** The default plane behavior is **No Plane**. To place the graphic along a plane, select the plane from the **Plane** option.
8. Click again in the graphic view to designate the start point  of the arc.
9. Click a final time in the graphic view to designate the end point  of the arc.
10. Click **Close** to exit the command.

## Place a circle by three points

1. Select **Insert > Construction Graphics**.
2. Select **More...** in the **System** option.
3. Select the system under which you want to group the construction graphics.
4. Click **OK**.
5. Click **Circle**  under **Graphic Type** on the Construction Graphics ribbon.
6. Select **By 3 point** from the **Draw** option.
7. Click in the graphic view to place the start point  of the circle.  
**NOTE** The default plane behavior is **No Plane**. To place the graphic along a plane, select the plane from the **Plane** option.
8. Drag the cursor, and click to specify the second point .
9. Drag the cursor again to widen the circumference of the circle.
10. Click again in the graphic view to designate the third point .
- TIP** When specifying the third point, you can move the cursor left or right to shift the circle in the corresponding direction.
11. Click **Close** to exit the command.

## Place a circle by center

1. Select **Insert > Construction Graphics**.
2. Select **More...** in the **System** option.
3. Select the system under which you want to group the construction graphics.
4. Click **OK**.
5. Click **Circle**  under **Graphic Type** on the Construction Graphics ribbon.
6. Select **By center** from the **Draw** option.
7. Click in the graphic view to place the center point  of the circle.  
**NOTE** The default plane behavior is **No Plane**. To place the graphic along a plane, select the plane from the **Plane** option.
8. Drag the cursor to widen the circumference of the circle.
9. Click again in the graphic view to designate the second point  and place the circle.
10. Click **Close** to exit the command.

## Place a rectangle by three points

1. Select **Insert > Construction Graphics**.
2. Select **More...** in the **System** option.
3. Select the system under which you want to group the construction graphics.
4. Click **OK**.
5. Click **Rectangle**  under **Graphic Type** on the Construction Graphics ribbon.
6. Select **By 3 point** from the **Draw** option.
7. Click in the graphic view to place the first point . Then, drag the cursor either to the left or the right.  
**NOTE** The default plane behavior is **No Plane**. To place the graphic along a plane, select the plane from the **Plane** option.
8. Click to designate the second point . Then, drag the cursor either up or down.  
*The second point determines the length of the rectangle.*
9. Click to place the third point  and specify the width of the rectangle.
10. Click **Close** to exit the command.

## Place a rectangle by two points and direction

1. Select **Insert > Construction Graphics**.
2. Select **More...** in the **System** option.
3. Select the system under which you want to group the construction graphics.
4. Click **OK**.
5. Click **Rectangle**  under **Graphic Type** on the Construction Graphics ribbon.
6. Select **By 2 point and Direction** from the **Draw** option.
7. Click in the graphic view to select the point of direction .  
**NOTE** The default plane behavior is **No Plane**. To place the graphic along a plane, select the plane from the **Plane** option.
8. Drag the cursor to draw the vertex point of the diagonal  in the direction in which you want the rectangle to extend.  
**NOTE** Dragging the cursor to the right or left results in a vertical rectangle, while dragging the cursor up or down results in a horizontal rectangle.
9. Click to place the second vertex of the diagonal .
10. Click **Close** to exit the command.

## SECTION 8

# Format Menu

The **Format** menu provides commands for formatting views and styles and maintaining surface style rules. Some of the commands on this menu may change depending on the active task.

### ***In This Section***

Format View.....	296
Format Style .....	308
Surface Style Rules .....	323

## Format View

Formats a view according to settings on the **Format View** dialog box. You access this command by selecting **Format > View**.

When you define three-dimensional views, you can format the views with effects. You can use several techniques, such as rendering, to enhance model views. You can apply these settings to more than one view using a view style, or you can format a single view.

### **Setting Projection**

The projection of a view determines how close and at what angle objects appear in the workspace.

### **Specifying Rendering**

Rendering provides a more realistic view of a model. You can apply different rendering methods to the model such as smooth shading or outline images.

### **Enabling View Axis**

Indicates which direction is E (East), N (North), and EI (Elevation). N arrow points in the direction of the active coordinate system North in the model relative to the current view.

Indicates the X-, Y-, and Z-axes of the ship. Y arrow points in the direction of the active coordinate system port in the model relative to the current view.

### **Applying Formats**

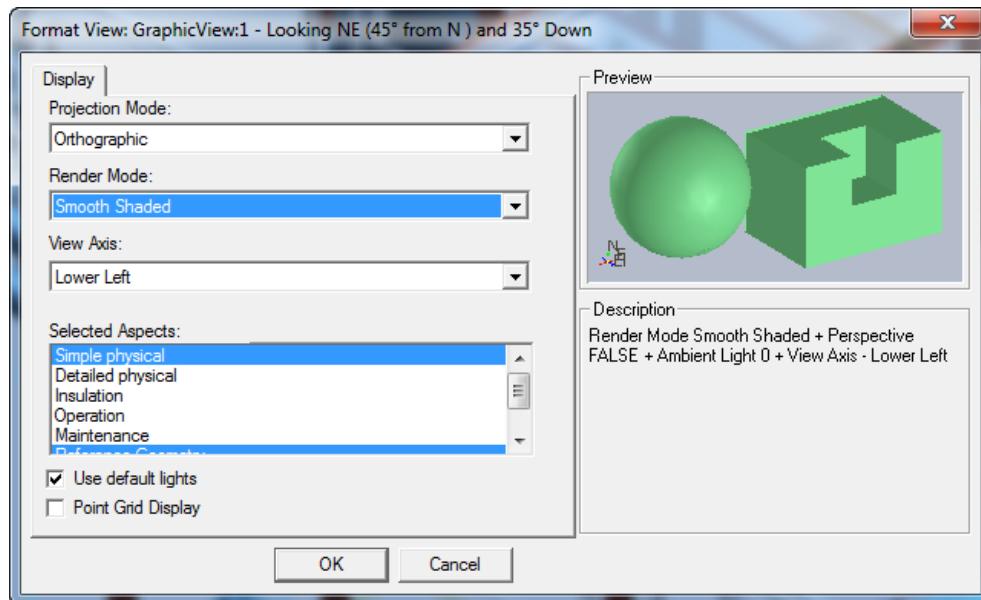
When you format a view, you can easily control what objects look like in a view. You can format views in the following ways:

- To apply unique settings to a view, you use the **Format > View** command. The formats you apply with this command override the view style of the active window.
- If you select one of the shaded edges rendering options (**Shaded with Enhanced Edges** or **Shaded with Hardware Enhanced Edges**), you can set the edge colors for objects in the current view in the **Enhanced Edges** tab of the **Format View** dialog box.

- To apply the same settings to more than one view quickly and efficiently, you can apply a view style with the **Apply View Style** command on the **View** menu. For more information, see *Apply View Style* (on page 232).
- You can also format the styles used within each view using the **Format > Style** command. For more information, see *Format Style* (on page 308).

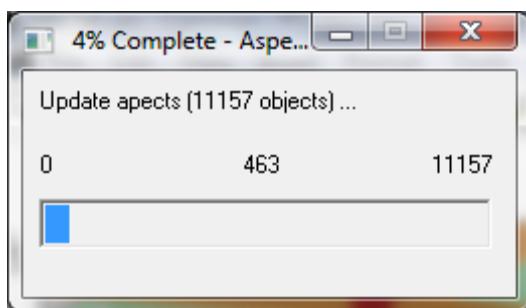
## Format a view

- Click **Format > View**. For more information on the dialog box, see *Format View Dialog Box* (on page 299).



- Set the **Projection Mode** to specify the projection style to use in the graphic window. Select **Orthographic** to produce a parallel projection. Select **Perspective** to give the displayed objects a vanishing point in the graphic window.
- Select a **Render Mode** for the physical appearance of three-dimensional objects in the workspace.
- TIP** If you select **Shaded with Enhanced Edges** or **Shaded with Hardware Enhanced Edges** as the **Render Mode**, the **Enhanced Edges** tab displays so that you can select the edge color. For more information, see *Set enhanced edge color* (on page 298).
- Select the **View Axis** to display the coordinate triad in the workspace, with respect to the active coordinate system. By default this option is set to **None**.
- Select the **Aspects** you want applied to the view formatting.
- To define custom lighting, clear the **Use default lights** check box, and select the **Lights** tab. For more information, see *Lights Tab (Format View Dialog Box)* (on page 305).
- TIP** To display the **Lights** tab, clear the **Use default lights** box on the **Display** tab.
- Click **OK** to apply the changes and dismiss the dialog box, or click **Cancel** to dismiss without making the changes.
- TIP** The **Preview** area shows graphically the options you select on this dialog box.

When there are 500 or more objects from the selected aspects, Smart 3D displays a message box similar to the one below. This message box shows the progress of the objects as they are being loaded.



### NOTES

- To define or modify a view style, you can click **Format > Style**. This command allows you to apply the same view settings to more than one view easily. For example, if you wanted to shade a model, you can save a view style with the shading options you want. Then, you can apply the view style to more than one view of the model. For more information, see *Format Style* (on page 308).
- To change the view style of a window, you can click **View > Apply View Style**. You can apply a view style to several views with this command. For more information, see *Apply View Style* (on page 232).

## Set enhanced edge color

If you select either the hardware or software enhanced edges rendering options as the render mode, you can set the edge color for objects in the current view.

**NOTE** In previous versions of Smart 3D, the enhanced edge color (hardware and software) could be changed per system through the CoreDisplaySettings.ini file in the [Product Folder]/Core/Shared/bin folder. If you have edited this file to set the enhanced edge color, your settings are now ignored. Follow the steps below to set color options for enhanced edges, and then save them to your current session file.

1. Click **Format > View**.

*The Format View dialog box appears. For more information on the dialog box, see Format View Dialog Box (on page 299).*

2. On the **Display** tab, select either the **Shaded with Enhanced Edges** or **Shaded with Hardware Enhanced Edges** as the **Render Mode** for the physical appearance of three-dimensional objects in the workspace.

**NOTE** The **Shaded with Hardware Enhanced Edges** is an alternate display option to **Shaded with Enhanced Edges** in that it uses the graphics card to draw the enhanced edges faster than the traditional enhanced edge mode. However, this option may not be supported by your graphics driver or graphics card. Smart 3D checks your system information and does not display this option if it is not supported.

3. Click the **Enhanced Edges** tab. For more information on color options provided in the tab, see the *Enhanced Edges Tab (Format View Dialog Box)* (on page 306).
4. Select the color option to use. If you select **Use a single Specified Outline Color**, click **Edit**, and then set the color.

5. Use the **Contrast** slider to lighten or darken the edges of objects. Move the slider to the left to make the edges lighter or to the right to make them darker.

*The Preview window dynamically displays your settings on example objects. The text description shows the selected rendering mode and other display options.*

**TIP** The **Edit** button applies only to the **Use a single Specified Outline Color** option. If you click the **Edit** button and select a color, the **Use a single Specified Outline Color** option is automatically selected.

6. Click **OK** to apply the changes and dismiss the dialog box, or click **Cancel** to dismiss without making the changes.

*Your settings are saved in the session file.*

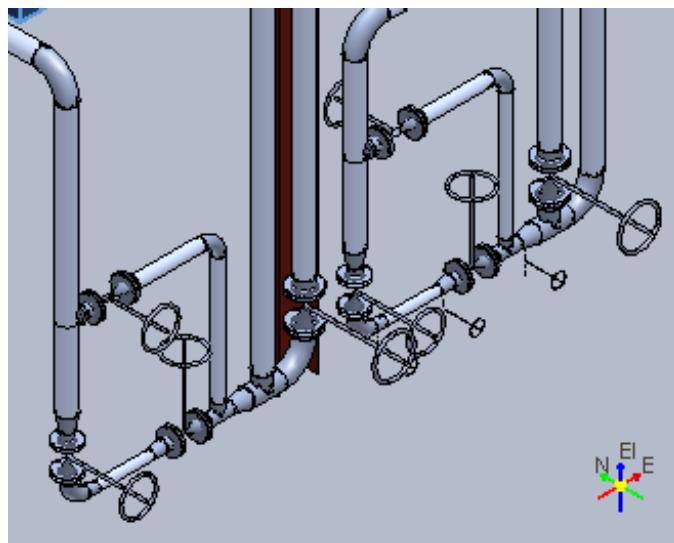
## Format View Dialog Box

Accesses the format override settings for a view. You can override any aspect of a view style for the active window without actually modifying the underlying view style definition. From the **Display** tab, you can determine the appearance of the view using the following settings:

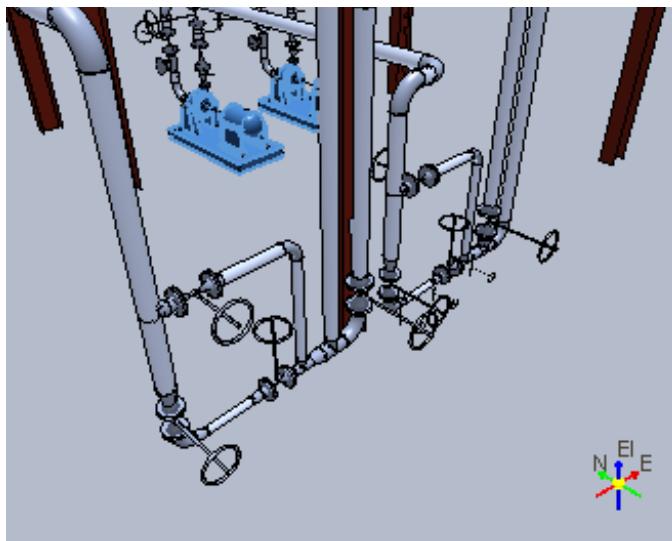
### Projection Mode

Specifies how close and at what angle objects appear in the workspace. The options available are as follows:

- **Orthographic** - Select this option if you want the display to use a parallel projection.



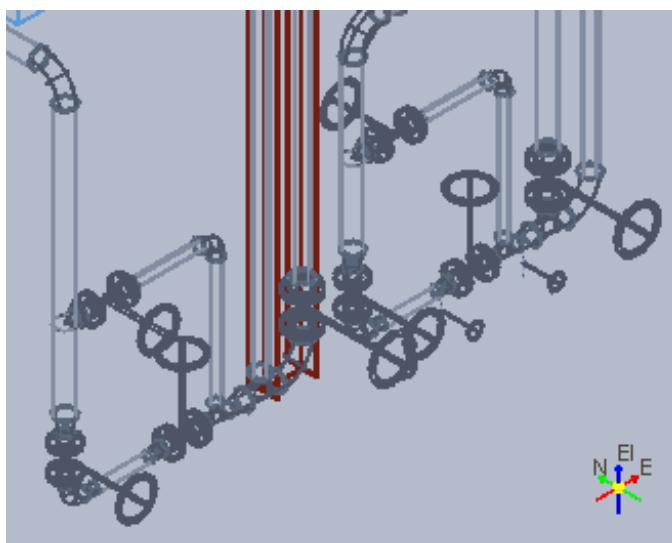
- **Perspective** - Select this option if you want the display to include a vanishing point.



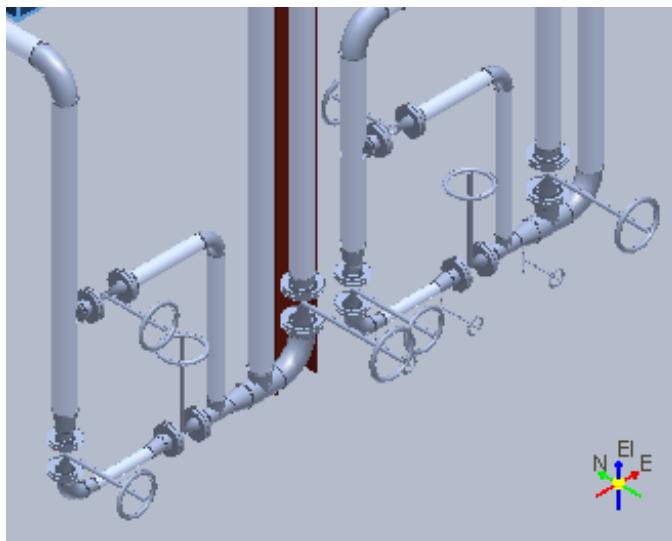
#### Render Mode

Determines the physical appearance of 3D objects in the workspace. The options available are as follows:

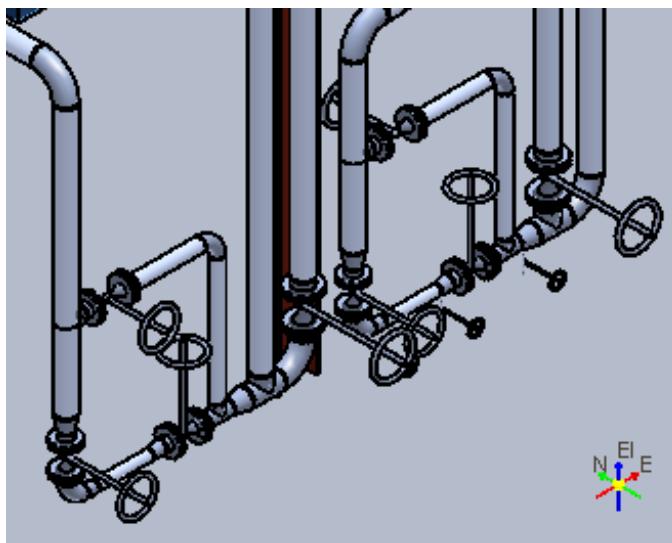
- **Outline** - Displays objects with edges as a single line and the surfaces solid. Edge lines and faces not within the normal view are hidden. This setting provides a fast and simple way to review spacing relationships between objects. Because this view involves hidden lines, the display is less cluttered.



- **Smooth Shaded** - Displays objects in a solid format with smooth shaded surfaces.



- **Shaded with Enhanced Edges** - Displays objects the same as the **Smooth Shaded** option but with a dark line emphasizing the edges of the objects.

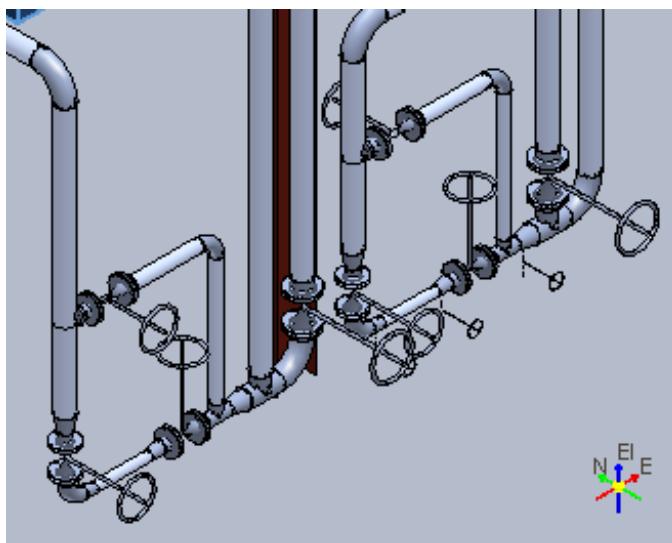


- **Shaded with Hardware Enhanced Edges** - Provides a faster solution for displaying enhanced edges. This option is an alternate display option to **Shaded with Enhanced Edges** in that it uses the software running on your system's video card.

#### ■ NOTES

- The **Shaded with Hardware Enhanced Edges** mode does not support the high quality, anti-alias smooth edge display.

- This option may not be supported by your graphics driver and/or graphics card. Smart 3D checks your system information and does not display this option if it is not supported. Loading a new graphics driver could make this option available.

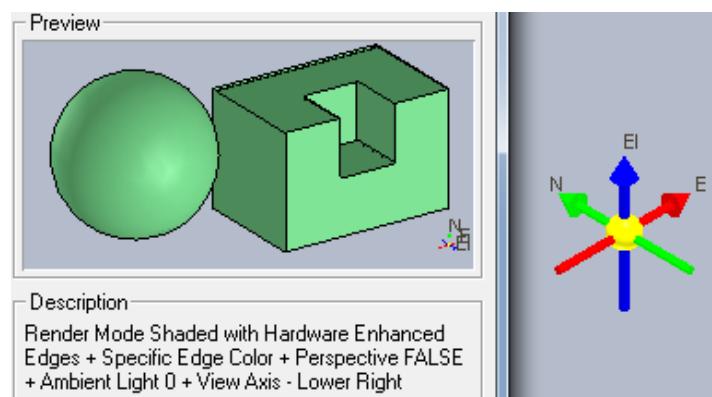


### View Axis

Indicates the orientation of active view. Following are the positions available:

- None** - View axis is not visible in the active view (default option).
- Lower Left** - Select this option to position view axis in lower left corner of the active view.
- Upper Left** - Select this option to position view axis in upper left corner of the active view.
- Lower Right** - Select this option to position view axis in lower right corner of the active view.
- Upper Right** - Select this option to position view axis in upper right corner of the active view.

The view axis can be enabled and positioned independently for each view. Because the active coordinate system is a global setting, every view has the same active coordinate system.



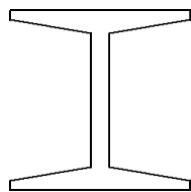
**NOTE** If view axis is set to **None**, then there is no indication shown for Preview and Description.

### Selected aspects

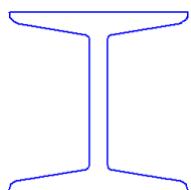
Provides a list of available aspects to which you can apply the view formatting. Aspects are parameters that represent additional information needed for placement, such as safety or maintenance clearances.

An aspect is a geometric area or space related to an object. The aspect represents information about the object, such as its physical shape or the space required around the object. Aspects are associated parameters for an object, representing additional information needed for placement. Aspects can represent clearances for safety or maintenance, additional space required during operation, or simple and detailed representations of the object. You define aspects when you model a part class for the reference data.

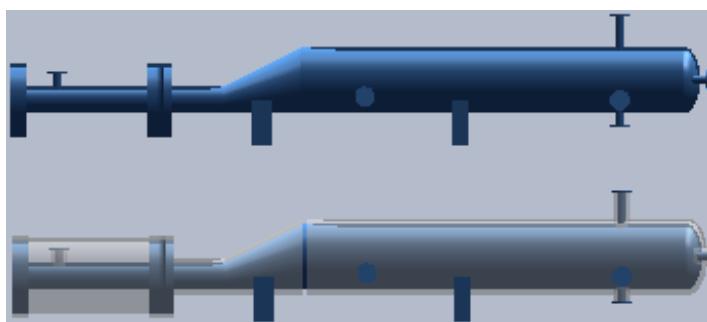
- **Simple physical** - Includes primitive shapes. This aspect creates a less cluttered view of the object, showing only the body of equipment or a simplified cross-section for structure, as shown below.



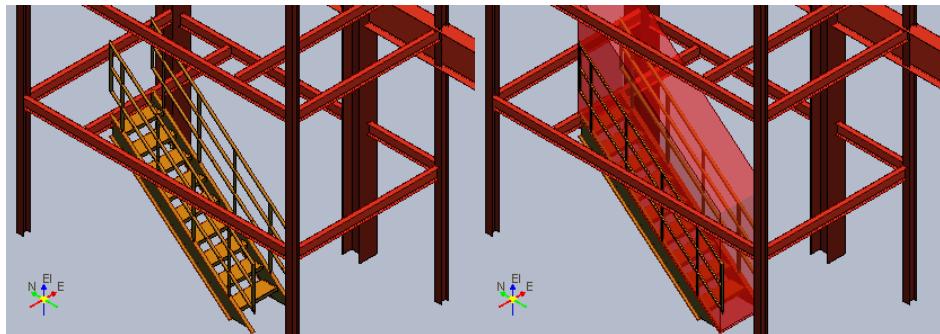
- **Detailed physical** - Provides a more detailed view of an object. This aspect shows all the graphical details associated with the equipment or structure. For example, certain types of equipment may include legs and lugs. For marine structure, this aspect uses all geometry in the cross-section, as shown below.



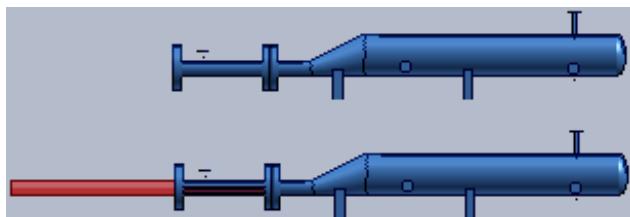
- **Insulation** - Shows an area around a piece of equipment indicating the presence of insulation. This aspect is also used to display structural fireproofing insulation. For example, a 4-inch pipe with insulation might look like an 8-inch pipe when this aspect is used.



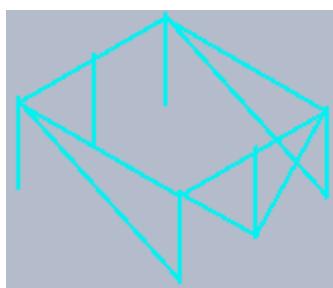
- **Operation** - Includes the area or space around the object required for operation of the object. This space shows in the model but not in drawings. For example, this aspect leaves enough space around a motor for a person to operate the motor or the overhead space needed for someone to walk up a stairway.



- **Maintenance** - Includes the area or space around the object required to perform maintenance on the object. This space may appear in the model but not in drawings. For example, this aspect leaves enough space around a motor to perform maintenance on a motor, including space to remove the motor.



- **Reference Geometry** - Allows you to construct or add graphical objects that do not participate in interference checking. For example, a reference geometry object could be a spherical control or the obstruction volume for a door. For marine structure, this aspect allows you to control the display of landing curves for design seams, profile systems, reference curves, and knuckle curves.
- **Centerline** - Displays objects as a single line representation. For example, this aspect is useful for when you want to display handrails or structural members as a single-line on drawings. For structure, the centerline is determined from the cardinal point used to place the member. That cardinal point is not always the center of the object.



- **Molded Forms** - Displays plate, profile, and beam systems for marine structure.
- **Equipment Hole** - Displays holes for marine structure created in the Hole Management task.
- \* - Matches all cross-sections.

**NOTE** For piping and equipment objects in plant mode, **Insulation**, **Equipment Hole**, **Maintenance**, and **Operation** aspects displaying in the 3D graphic view also display in the Sketch 2D environment.

#### Preview

Previews graphically the options you select on this dialog box.

#### Description

Provides a text description of the specified rendering style.

#### Use default lights

Specifies whether you want to use the default lights in the model, or use the **Lights** tab to define custom lighting. The **Lights** tab is hidden when this box is checked.

#### Point Grid Display

Allows you to select or clear the **Point Grid** display option for styles and views or both.

#### See Also

*Format View* (on page 296)

*Lights Tab (Format View Dialog Box)* (on page 305)

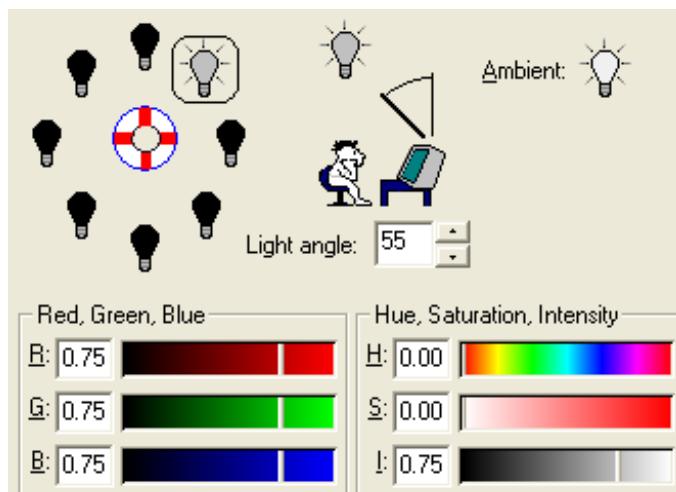
*Enhanced Edges Tab (Format View Dialog Box)* (on page 306)

## **Lights Tab (Format View Dialog Box)**

Provides options for selecting a light source, light color, and light angle for illuminating the objects in the workspace.

The software provides you with a graphical method for selecting a light source. There are seven black light bulb icons and one gray light bulb icon arranged in 45-degree increments around a circle. The center of the circle is the area to which the light is directed. The light bulb icon that you select determines the angle of the light source. The gray light bulb icon is the 45-degree default. In the illustration below, the circled bulb represents the selected bulb.

The box beside the icon of the seated user at the monitor allows you to select the plane of projection for the light by selecting a number from the list. Therefore, if you first select the 45-degree default bulb and then select 60 from the list, the workspace is illuminated at a 45-degree angle on a 60-degree plane.



**Ambient**

Controls the ambient reflectivity of a material, that is, the degree to which the ambient lighting in the overall model is reflected by the surface of the material. The total ambient light value of a surface is calculated by multiplying the ambient reflectivity value by the model ambient light setting. The ambient reflectivity value can range from 0 to 1, where 0 is no ambient light reflected and 1 is full ambient reflectivity.

For example, if the overall ambient light setting for the model is set to 1.0, and a material has an ambient reflectivity value of 0.10, model elements using that material have an effective ambient lighting value of 10%. A lower ambient light value causes the shadows that fall on the material to be dark, with a high contrast between the directly and indirectly lit areas. A higher ambient light value results in a more uniformly lit surface, fainter shadows, and less overall contrast in lighting. This setting would be desirable, for example, if you wished to create a bright, uniformly lit ceiling in a room.

You can use the color mixer to select the color of the ambient light.

**Light**

Provides eight parallel light sources with a predefined angular position around the view vector. You can select each light and then define its color using the color mixer. The color of each light bulb represents its true color, which is user-definable.

**Light angle**

Defines the angle of light to the view vector for a selected light. The default value is 30.

**Red, Green, Blue**

Adjusts the amount of red, green, and blue by typing values in the value box or using the sliders.

**Hue, Saturation, Intensity**

Adjusts the amount of color saturation and intensity to apply by typing values in the value box or using the sliders.

**NOTE** This tab is only shown when the **Use default lights** check box on the **Display** tab is cleared in the **Format View** dialog box.

**See Also**

*Format View Dialog Box* (on page 299)  
*New View Style Dialog Box* (on page 321)

***Enhanced Edges Tab (Format View Dialog Box)***

Sets the color of enhanced edges when you set **Render Mode** to **Shaded with Enhanced Edges** or **Shaded with Hardware Enhanced Edges**. Otherwise, this tab is not displayed.

**Use the Colors of the Objects**

Outlines each object using a slightly darker version of its own color. This option makes the outline less obvious, but slightly enhances the edges of the objects.

**Contrast**

Works in conjunction with the **Use the Colors of the Objects** to lighten or darken the edge of an object compared to the object color. The **Contrast** slider values represent a scale from -100 to 100 where -100 is 100% white and 100 is 100% black. The slider tick marks represent increments of 10 with negative-to-positive values going from left to right (-100, -

90, -80... -10, 10, 20, 30, and so on). The default value is **40**.

#### Use a single Default Outline Color

Displays all object edges using the default color, which is a white-on-dark background or a black-on-light background. The outline default is based on the current combined color intensity of the background color.

#### Use a single Specified Outline Color

Displays all object edges in the color you select with the **Edit** command.

#### Edit

Works in conjunction with the **Use a single Specified Outline Color** option and displays the **Colors** dialog box. You can select or create an edge color.

#### Preview

Reflects the color options you select in this tab.

#### Description

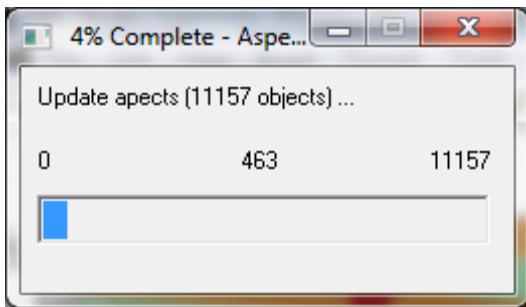
Provides a text description of the rendering style and edge colors.

#### See Also

*Format View Dialog Box (on page 299)*

## Aspect Refresh in Progress Message Box

Displays when there are 500 or more objects from the selected aspects being loaded. This message box shows the progress of the objects as they are being loaded.



You can minimize, maximize, or close the message box. The message box automatically closes when the process is completed.

**NOTE** When you close the message box, you cannot re-open it.

## Format Style

Creates, modifies, and applies styles to views or selected objects to make them appear the way you want if you have the permission to do so. You can also define or modify the style override for currently selected objects.

The software incorporates two types of styles: view styles and surface styles. View styles affect the way that all objects appear in the active view, such as whether they appear in solid or outline mode. When you apply a view style, all objects in the active view change. For example, when you set the rendering mode to outline for a view, all objects in that view are shown in outline form.

Surface styles impact the appearance of specific objects in your workspace. If you want a filtered group of objects to appear consistently in certain colors, textures, and other formats in your workspace, you can define their appearance by applying surface style rules. These rules apply to all existing objects in your workspace that meet the filter requirements and to any new objects you place in the workspace that meet the rules filter.

The appearance properties of three-dimensional elements include curves, surfaces, and groups of surfaces. The properties of a curve include color and line style. The properties of a surface include specular and diffuse color and rendering mode. The software treats the edges of a surface as curves, and these curves can have appearance properties that are different from their parent surface. You can define the appearance properties of curves and surfaces using surface style rules.

### Creating and Managing Styles

Using the **Style** command on the **Format** menu, you can create several styles so objects in a view appear the way you want. You can copy or modify the styles delivered with the software, or you can set up new ones that conform to your unique requirements. The software stores both the view style and surface style definitions in the workspace. The software stores the surface style rules in the Model database.

The software supports two types of styles: Surface and 3D View. A style type contains one or more styles. You can create styles for each style type.

The software manages the surface style rules on the basis of each Model database in a Site. You can immediately apply a style rule to your workspace when you create it, or you can save the rule and apply it later through a surface style rule. Each workspace contains a list of the surface style rules you can apply to objects in the workspace. A default style rule in the workspace defines the style for all objects that do not have a style defined by another rule.

The software provides a set of surface styles for your application in the workspace. You can use these surface styles to tailor the rules as needed to accomplish your functional task.

### Guidelines for Creating Surface Style Colors and Lighting

You can create new surface style colors and lighting when you create a new or modify an existing surface style. Use the guidelines below to assist you in creating surface styles. For more information on creating new surface styles or modifying existing surface styles, see *Format Style* (on page 308).

- Set **Ambient** to the base color of the style.
- Set **Diffuse** to approximately eighty percent of the **Ambient** color setting. You can achieve different shades by adjusting both **Ambient** and **Diffuse** color settings.

- Set **Emission** to approximately fifty percent of the **Ambient** color setting. This color can be used for highlighting.
- Set **Specular** to a non-zero number. Lower values avoid the "white-hot" appearance.

## NOTES

- Each of the color settings in the style responds to the corresponding component in light. It is very important to balance the style colors with the light settings.
- We recommend that you use lighter colors for the **Ambient** color setting. Black or dark **Ambient** color settings can distort the lighting model with dark areas.
- We recommend that you use **Specular** settings sparingly. **Specular** causes "white-hot" areas on surfaces. The larger the specular areas are, the brighter and stronger the specular response to light is.

## Applying Styles to Views

After you create a view style on the **Style** dialog box, you can apply it to any view by selecting the style in the list and clicking **Apply**. You can also apply a view style to any view by clicking **View > Apply View Style**. The view style only applies to the selected view. You can make the style apply to all views by selecting the **Apply All** option on the **Apply View Style** dialog box.

Like view style definitions, the software stores the applied view styles in the workspace.

## Applying Styles to Selected Objects

After you create a surface style on the **Style** dialog box, you can apply it to selected objects in the workspace by selecting the style in the list and clicking **Apply**. If you have not selected any objects, then this command is unavailable.

You can select multiple objects and apply the same style to the entire selection. This action removes any previous formats and applies the formats of the new style. You can apply styles to selected objects interactively or with a filter.

## Applying Styles to Parts

For routing tasks, you should apply style rules to parts - not to runs or features. During processing by the software, parts of a run correspond most closely to stock parts. Therefore, for the filter for the run, you need to select **Pipes**, instead of **Piping Parts** for the basis object.

Rules for piping components and instruments require several object types. The basis objects use two possible classes, **Piping Components** and **Piping Instruments**. For the related object type, the three possible classes are **Piping Along Leg**, **Piping End**, and **Piping Turn**. You must create a rule for each combination, which results in six separate rules for features.

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## What do you want to do?

- *Create a surface style* (on page 310)
- *Apply a surface style* (on page 310)
- *Modify a surface style* (on page 311)
- *Delete a surface style* (on page 311)
- *Apply a permission group to styles* (on page 311)

- *Create a 3D view style* (on page 312)
- *Apply a 3D view style* (on page 312)
- *Modify a view style* (on page 313)
- *Delete a view style* (on page 313)

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## Create a surface style

1. Click **Format > Style**.
2. Click **New** on the **Surface** tab.
3. Type a name for the style in the **Name** box on the **General** tab of the **New Style** dialog box.
4. Complete one of the following actions: (1) Select a current style from the **Based on** list on which to base the new style; or (2) Select **(no style)** from the **Based on** list to make the new style unique.
5. Select a render mode from the **Render mode** list
6. On the **Edges** tab, select the edge color and line pattern, width, and height.
7. On the **Faces** tab, select the face color, shininess, and opacity.
8. Click **Apply**.

**NOTE** To see how your style affects the appearance of objects, select one or more of the objects on the **Preview object** list.

## Apply a surface style

1. Select one or more objects to which you want to apply a surface style.
2. Click **Format > Style**.
3. Select a style from the **Styles** list on the **Surface** tab.
4. Click **Apply** to change the objects you selected.

### NOTES

- You can apply a surface style to multiple objects at once by using the **Tools > Select by Filter** command.
- If you do not select an object in the workspace, the **Apply** button on the **Modify Style** dialog box is not available.
- If you select several objects from different style types, the **Styles** list is blank.
- To add additional styles to your workspace, click **Format > Style**, and then click **New**.

## Modify a surface style

1. Click **Format > Style**.
2. Select the style to modify from the **Styles** list on the **Surface** tab.
3. Click **Modify**.
4. If you want to rename the style, type a name for the style in the **Name** box on the **General** tab of the **Modify Style** dialog box.
5. Change the style properties on the **Edges** and **Faces** tabs as needed.
6. Click **Apply**.

### NOTES

- You can rename styles only if you have the appropriate permissions. See your system administrator or site manager to grant the appropriate permissions for renaming styles.
- You can see how the style changes affect the appearance of an object by checking the picture under **Preview**.

## Delete a surface style

1. Click **Format > Style**.
2. Select the style to delete from the **Styles** list on the **Surface** tab.
3. Click **Delete**.

**NOTE** The surface style applies to an object even after you delete the style. For example, if you make a boiler surface copper and then delete copper, the boiler still appears copper even though you deleted that style from the list.

## Apply a permission group to styles

1. Click **Select**.
2. Click **Format > Style**.
3. Select a permission group in the **Permission Group for Styles** drop-down menu.
4. Click **Apply**.

### NOTES

- Style permissions are controlled by the Model administrator by default. Styles in databases migrated to Version 2009.1 do not have any permission groups assigned by default.
- This permission group setting applies to all styles in the **Styles** list.
- Users without permissions can apply surface styles, but cannot modify or create styles.

## Create a 3D view style

1. Click **Format > Style**.
2. On the **Style** dialog box, click **3D View**.
3. Click **New**.
4. On the **New View Style** dialog box, type a name for the new style in the **Name** box.
5. Complete one of the following actions: (1) Select a style in the **Based On** list to base the new style on an existing style; or (2) Select **(no style)** to create a totally new style that is not based on another style.
6. On the **Display** tab, select the projection, render mode, and aspects that you want rendered.
7. On the **Lights** tab, specify custom lighting, if necessary.  
**TIP** To display the **Lights** tab, clear the **Use default lights** box on the **Display** tab.
8. Click **Apply**.

### **NOTES**

- You can see how the style affects the way an object looks by checking the picture under **Preview**.
- If you do not want any of the perspective views listed in the **Perspective** box on the **Display** tab, you can select **None (Orthogonal)** in the **Perspective** box.
- After you create a new view style, you can apply the style to the active view. Click the view style name in the list, and then click **Apply**.

## Apply a 3D view style

1. Select the view to which you want to apply the style.
2. Click **Format > Style**.
3. Click the **3D View** tab.
4. Select the style to apply from the **Styles** list.
5. Click **Apply**.

**NOTE** You can also apply the view style to multiple views with the **View > Apply View Style** command. Click **Apply All** on the **Apply View Style** dialog box.

## Modify a view style

1. Click **Format > Style**.
2. Click the **3D View** tab.
3. Select the view style to modify from the **Styles** list.
4. Click **Modify**.
5. If you want to rename the view style, type a name for the style on the **Name** tab of the **Modify View Style** dialog box.
6. Change other view style settings on the **Name**, **Display**, and **Lights** tabs as needed.  
**TIP** To display the **Lights** tab, clear the **Use default lights** box on the **General** tab.
7. Click **Apply**.

### NOTES

- The software saves view styles in the session file.
- You can see how the view style changes affect the appearance of objects by checking the picture under **Preview**.
- If you do not want any of the projection views listed in the **Projection mode** box on the **Display** tab, you can select **None (Orthogonal)** in the **Perspective** box.

## Delete a view style

1. Click **Format > Style**.
2. Click the **3D View** tab.
3. Select the style to delete from the **Styles** list.
4. Click **Delete**.

**NOTE** A view style remains applied even after you remove the style from the **Styles** list.

## Style Dialog Box

Sets options for manipulating surface and 3D view styles.

### **Topics**

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## Surface Tab (Style Dialog Box)

### Styles

Lists all the currently available surface styles.

### List

Controls the contents of the list in the **Styles** box. You can select either **All Styles** or **Styles Used in Workspace** in the list box.

### Permission Group for Styles

Controls write privileges for styles. You can select a permission group from the list to override the default Model administrator permissions.

### Description

Shows a text description of the selected style.

### Apply

Applies the selected style to the active view.

### Cancel

Closes the dialog box without saving changes or applying them to the active view.

### New

Displays the **New Style** dialog box.

### Modify

Displays the **Modify Style** dialog box.

### Delete

Removes the selected style for the list and the database. This option is disabled for default surface styles to prevent them from being deleted.

 **NOTE** For more information on creating a new style or modifying an existing style.

### See Also

*New/Modify Style Dialog Box* (on page 315)

*Style Dialog Box* (on page 313)

## 3D View Tab (Style Dialog Box)

### Styles

Lists all the currently available view styles.

### Description

Shows a text description of the selected 3D view style.

### Apply

Applies the selected style to the active view.

### Cancel

Closes the dialog box without saving changes or applying them to the active view.

**New**

Displays the **New View Style** dialog box.

**Modify**

Displays the **Modify View Style** dialog box.

**Delete**

Removes the selected style from the list and the database. You cannot delete the default style.

**NOTE** For more information on creating a new 3D view style or modifying an existing style, see *New View Style Dialog Box* (on page 321).

**See Also**

*New/Modify Style Dialog Box* (on page 315)

*Style Dialog Box* (on page 313)

## New/Modify Style Dialog Box

Sets options for manipulating the styles and appearance of the surfaces and edges of objects and how they look in the workspace. This dialog box appears when you click **New** or **Modify** on the **Surface** tab of the **Style** dialog box.

**Topics**

General Tab (New/Modify Style Dialog Box) ..... 315

Edges Tab (New/Modify Style Dialog Box) ..... 316

Faces Tab (New/Modify Style Dialog Box) ..... 318

### General Tab (New/Modify Style Dialog Box)

Sets options for naming a new surface style, basing the new style on a current style and determining the rendering mode for displaying objects in the workspace.

**Name**

Specifies a unique name for the new surface style.

**Based on**

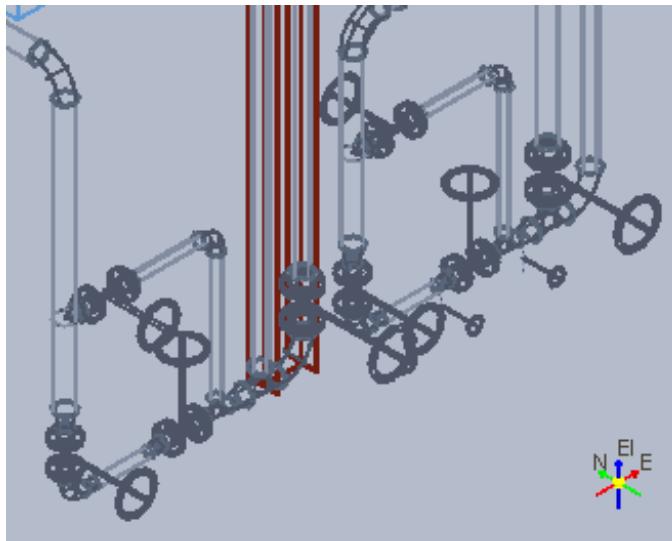
Lists all the current styles on which you can base a new style. If you do not want to base the new style on a current style, you can select the no style option.

**Render Mode**

Determines the physical appearance of 3D objects in the workspace. The options available are as follows:

- **View Default** - Use the render mode assigned to the view.

- **Outline** - Displays objects with edges as a single line and the surfaces solid. Edge lines and faces not within the normal view are hidden.



The **Preview** options are defined as follows:

#### **Preview render mode**

Provides a view of a 3D object in each available render mode.

#### **Preview object**

Specifies an object type to display in the **Preview** area: **Sphere**, **Cube**, or **Teapot**. When you select one of the objects, the **Preview** area shows how your selected rendering mode affects that object type.

#### **Preview**

Displays the selected object type and render mode in graphic form for your preview.

#### **Description**

Provides a text description of the specified style.

#### **See Also**

*New/Modify Style Dialog Box* (on page 315)  
*Style Dialog Box* (on page 313)

## **Edges Tab (New/Modify Style Dialog Box)**

Defines how you see curved elements in three dimensions. Curved elements can be standalone curves or the edges of surfaces. Other complex elements can contain both curves and surfaces. The edges style does not apply to the display of profile and layout elements.

#### **Color**

Previews selected edge colors.

#### **Copy From Diffuse Color**

Defines the color either by copying the color from the **Diffuse** color on the **Surfaces** tab, or by defining it using the **Red**, **green**, **blue** or **Hue**, **saturation**, **intensity** color bars. In

In addition to defining the color of 3D curves, this property allows the color of a surface to differ from the color of its boundary curves.

#### Width

Adjusts the width of the curve and displays it in the **Preview** area. This value is not an exact dimension.

#### Pattern

Provides a list of predefined line patterns you can apply to a curve. Additionally, you can define your own pattern using the line pattern control, which is the area below the **Pattern** and **Length** boxes. Click in the boxes to turn the pattern on or off. When you define your own line pattern, the **Length** value defines a scaling of this pattern as applied to curves.

#### Length

Adjusts the line pattern and displays it in the **Preview** area.

#### Red, green, blue

Adjusts the amount of red, green, and blue. You can type a value in the box or use the sliders.

#### Hue, saturation, intensity

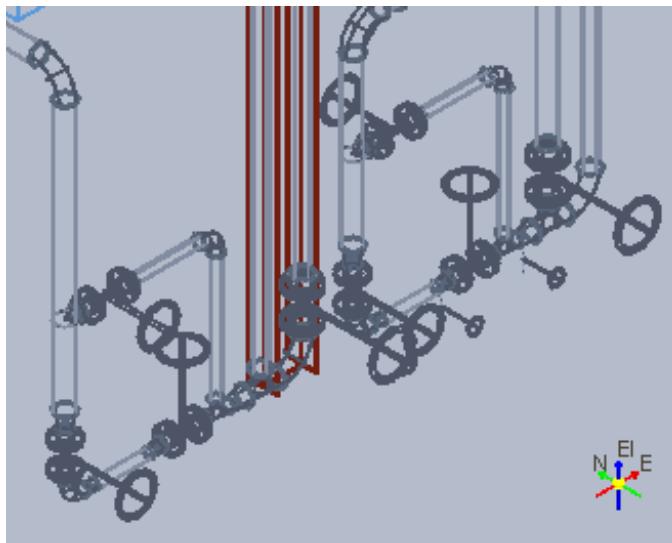
Adjusts the amount of color saturation and intensity. You can type a value in the box or use the sliders. The color and hue values must be between 0 and 1.

The **Preview options** are defined as follows:

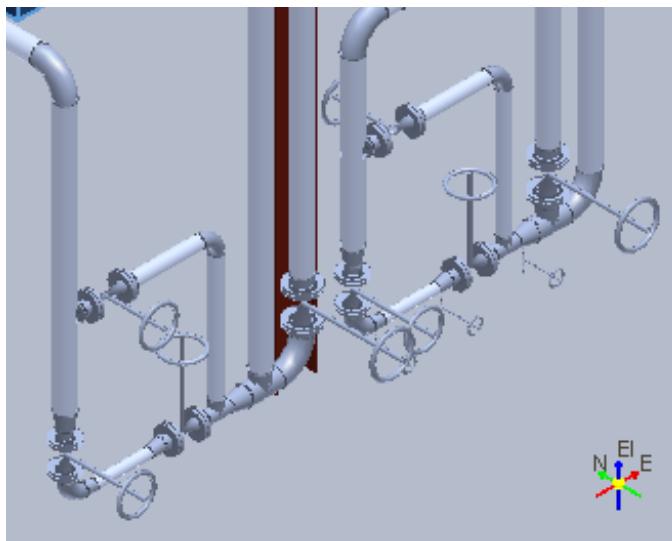
#### Preview render mode

Shows the physical appearance of 3D objects in the workspace. The options available are as follows:

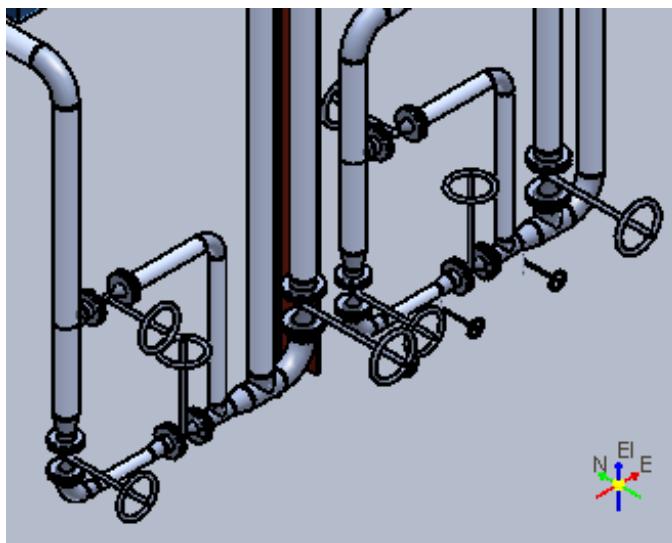
- **Outline** - Displays objects with edges as a single line and the surfaces solid. Edge lines and faces not within the normal view are hidden. This setting provides a fast and simple way to review spacing relationships between objects. Because this view involves hidden lines, the display is less cluttered.



- **Smooth Shaded** - Displays objects in a solid format with smooth shaded surfaces.



- **Shaded with Enhanced Edges** - Displays objects the same as the **Smooth Shaded** option but with a dark line emphasizing the edges of the objects.



### **Faces Tab (New/Modify Style Dialog Box)**

Defines the properties of rendered surfaces. You can control different components of color as defined by reflectance, emissive, and attenuation properties of the surface of an object.

#### **Diffuse**

Displays the amount of light a surface reflects equally in all directions. Unlike ambient light, diffuse light also depends on the direction of the light source. When a point on a surface is perpendicular to a light source, the surface reflects the maximum amount of light. When a point on a surface is parallel to a light source, the surface reflects no color based upon the light. Diffuse color is the color of diffuse light reflection from a light source.

**Specular**

Displays the specular reflection. Unlike diffuse light reflection, specular reflection fully depends on the direction of the light source. Additionally, specular reflection depends upon surface finish or texture. Specular color is the color of specular reflection for a light source.

**Ambient**

Displays ambient light for the surface appearance. In some cases, a point on a surface is not illuminated by any light source. You can think of ambient light as a light source that illuminates all points on all surfaces equally. Therefore, ambient light defines a minimum illumination for all surfaces. The ambient color is the diffuse light reflected from the light source.

**Emission**

Displays the emission light for the surface appearance. Emission originates from the object surfaces, rather than reflecting off the surface from a light source. When you define an emission color, a surface appears to glow.

 **NOTE** For guidelines for creating colors and lighting, see *Format Style* (on page 308).

**Copy From Edges Color**

Defines the color either by copying the color from the Diffuse color on the **Surfaces** tab or by defining it using either the **Red, green, blue** or **Hue, saturation, intensity** color bars. In addition to defining the color of 3D curves, this property allows the color of a surface to differ from the color of its boundary curves.

**Red, green, blue**

Adjusts the amount of red, green, and blue. You can type a value in the box or use the sliders.

**Hue, saturation, intensity**

Adjusts the amount of color saturation and intensity. You can type a value in the box or use the sliders. The color and hue values must be between 0 and 1.

**Shininess**

Controls the amount of specular reflection from a light source. If the shininess value is high, the surface appears as a polished piece of metal or an object covered with high-gloss paint. If the shininess value is low, the object appears as a piece of paper or an object covered with flat paint.

**Opacity**

Controls the degree to which a surface is visible behind an obscuring surface. If a surface has high opacity and high shininess, it has the appearance of glass. If a surface is less shiny, it looks more like plastic.

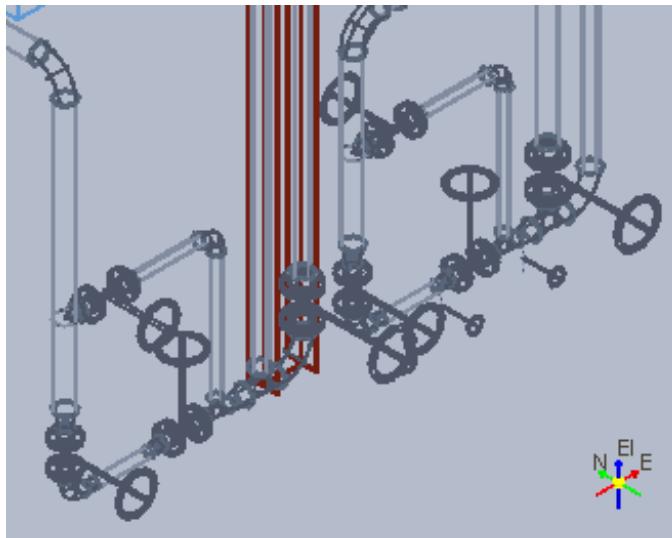
The **Preview options** are defined as follows:

**Preview render mode**

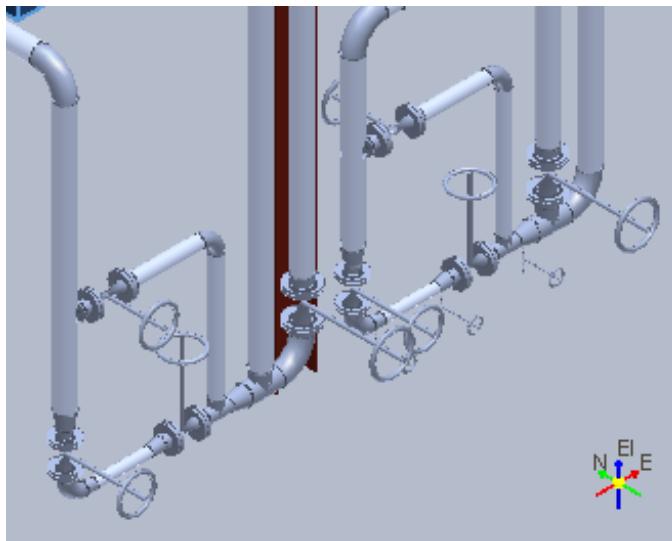
Determines the physical appearance of 3D objects in the workspace. The options available are as follows:

- **Outline** - Displays objects with edges as a single line and the surfaces solid. Edge lines and faces not within the normal view are hidden. This setting provides a fast and simple

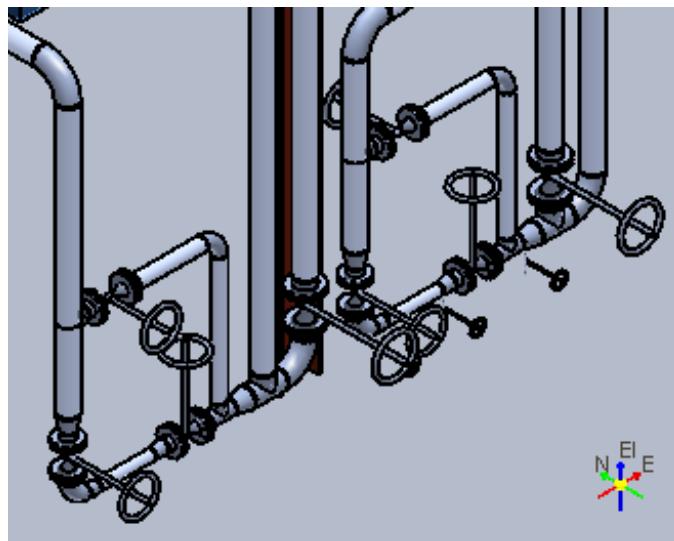
way to review spacing relationships between objects. Because this view involves hidden lines, the display is less cluttered.



- **Smooth Shaded** - Displays objects in a solid format with smooth shaded surfaces.



- **Shaded with Enhanced Edges** - Displays objects the same as the **Smooth Shaded** option but with a dark line emphasizing the edges of the objects.



## New View Style Dialog Box

Creates a new three-dimensional view style in which you can choose the rendering mode and perspective for viewing objects in the workspace. You access this dialog box by clicking **New** on the **3D View** tab of the **Style** dialog box.

### **Topics**

Name Tab (New View Style Dialog Box) .....	321
Display Tab (New View Style Dialog Box) .....	322

### **Name Tab (New View Style Dialog Box)**

Sets options for selecting a new view style name based on a predefined view style or creating a new view style.

#### **Name**

Displays the name for the new view style.

#### **Based On**

Lists all the currently predefined view styles on which you can base a new view style. If you do not want to base the new view style on another style, you can select the **(no style)** option to create a new style.

#### **Preview**

Previews graphically the options you select on this dialog box.

#### **Description**

Provides a text description of the view style specified.

## **Display Tab (New View Style Dialog Box)**

Sets options for applying the three-dimensional perspective, render mode, and depth fading to one or more of the listed aspects. The **Preview** window graphically displays your selections, and the **Description** box lists the selections in a textual format.

### **Projection Mode**

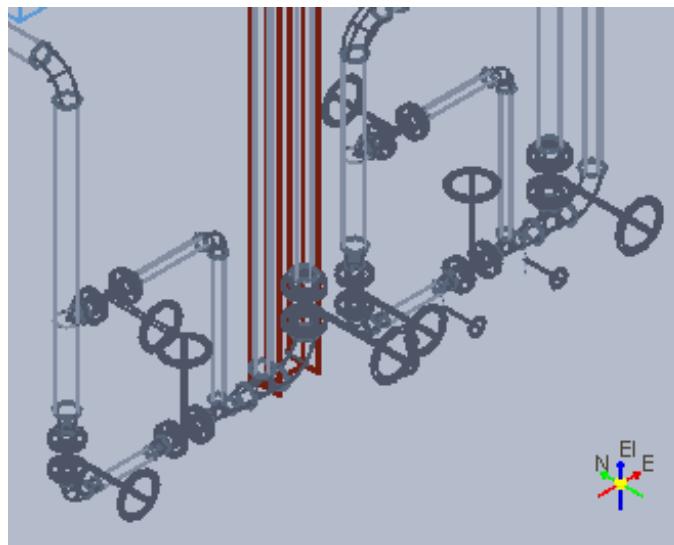
Specifies how close and at what angle objects appear in the workspace. The options available are as follows:

- **Orthographic** - Select this option if you want the display to use a parallel projection.
- **Perspective** - Select this option if you want the display to include a vanishing point.

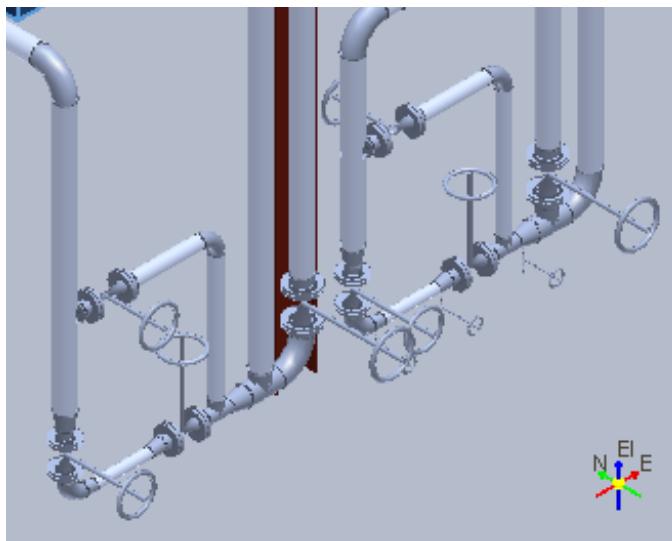
### **Render Mode**

Provides options for determining the physical appearance of three-dimensional objects in the workspace.

- **Outline** - Displays objects with edges that appear as a single line and the surfaces appear solid. Edge lines and faces that are not within normal view are hidden. This setting provides a fast and simple way to review spacing relationships between objects. Because this view involves hidden lines, the display is less cluttered.



- **Smooth Shaded** - Displays objects in a solid format with smooth shaded surfaces.



- **Shaded with Enhanced Edges** - Displays objects the same as the **Smooth Shaded** option but with a dark line emphasizing the edges of the objects.
- **Shaded with Hardware Enhanced Edges** - Provides a faster solution for displaying enhanced edges. This option is an alternate display option to **Shaded with Enhanced Edges** in that it uses the software running on your system's video card.

**NOTE** This option may not be supported by your graphics driver and/or graphics card. Smart 3D checks your system information and does not display this option if it is not supported. Loading a new graphics driver could make this option available.

## Surface Style Rules

Manages surface style rules. You can create and modify rules, as well as move rules from the style rule library to your workspace.

Surface style rules are based on filters. When you create or modify rules, you specify a filter on which to base the rule. For more information on filters, see *Select by Filter* (on page 354).

If you want objects to appear consistently in certain colors, textures, and other formats in your workspace, you can define their appearance by applying surface style rules. These rules apply to all existing objects in your workspace that meet the rule filter. The rules also apply to any new objects you place in the workspace that meet the filter.

The software evaluates the style rules when you do any of the following:

- Place a new object in the workspace.
- Edit an existing object.
- Click **File > Refresh Workspace**.
- Open a new workspace.
- Select a rule in the **Workspace** list, and then click **Apply** on the **Surface Style Rules** dialog box.

A named surface style rule consists of a name, a filter, and a surface style to apply to the objects returned by the filter. You can create or modify these surface styles by clicking **Format > Style**. By default, surface style rules apply to all selected aspects of objects.

The software stores the definition of surface style rules in the Model database. When you create a surface style rule, the rule is placed in the active permission group. The set of surface style rules you want to apply to a workspace is stored in the workspace.

Because the software manages surface style rule definitions on a site basis in the database, you may not have permission to modify some rules. You can create and apply a style rule to the workspace immediately, or you can create the style rule and apply it later. Each workspace contains a list of the surface style rules that apply to objects in that workspace. A default style rule exists in the workspace. It defines the style for all objects whose style was not set by another rule.

You can tailor the set of style rules selected for application in the workspace to suit your specific task requirements by using a session template. For example, one template can contain a style rule set that defines the physical appearance of certain objects. Another template can use a style rule set that assigns symbology by system. For example, you could assign a smooth copper texture to all hot water pipes.

The software applies surface style rules to parts only, not to features or runs. This concept is important to remember when working in routing tasks.

---

### What do you want to do?

- [Create a surface style rule \(on page 324\)](#)
- [Add a surface style rule to the workspace \(on page 325\)](#)
- [Copy a surface style rule from one model to another \(on page 325\)](#)
- [Remove a surface style rule from the workspace \(on page 326\)](#)
- [Remove a surface style rule from the database \(on page 326\)](#)
- [Modify a surface style rule \(on page 326\)](#)

---

## Create a surface style rule

1. Click **Format > Surface Style Rules**.
2. Click **New**.
3. Type a name for the new surface style rule in the **Rule name** box.
4. Select a filter in the **Filter** list, or click **More** to create a new filter if necessary.
5. [Create a New Filter \(on page 359\)](#)
6. Choose a style to apply in the **Style applied** list.
7. Select all the aspects that you want the filter to apply to by clicking in the **Select all aspects to which the style will be applied** list.

### NOTES

- You can add new surface styles to apply through rules on the **Format > Style** dialog box.

- After creating a new surface style rule, you can apply it to the workspace by selecting a rule in the **Style rule library** box and clicking **Add** to add the rule to the **Workspace** box.
- Because the software processes the rules in descending order, you should list the most specific rules at the top of the list. Click **Move Up** and **Move Down** to change the order of the rules in the **Workspace** list.

## Add a surface style rule to the workspace

1. Click **Format > Surface Style Rules**.
2. Select one or more rules to add from the **Style rules library** list.
3. Click **Add**.

### NOTES

- You can also add a new rule or modify an existing one from the **Surface Style Rules** dialog box.
- The software stores the list of applied surface style rules in the workspace.
- Because the software processes the rules in descending order, you should list the most specific rules at the top of the list. Click **Move Up** or **Move Down** to change the order of the rules in the **Workspace** list.

## Copy a surface style rule from one model to another

1. Click **Format > Surface Style Rules**.
2. On the **Surface Style Rules** dialog box, select one or more rules to copy from the **Workspace** list.
3. Click **Copy**.
4. Open the model into which you want to copy the rule.
5. Click **Format > Surface Style Rules**.
6. Click **Paste**.

### NOTES

- If the model into which you paste the rule already contains a rule by the same name, the software adds "Copy of" to the rule name to avoid duplicating names.
- The software removes any filter data specific to the object identifier when you copy a surface style rule into another model. The software converts the filter into a parameterized filter that prompts you for input for any areas that were removed.
- When you copy a style rule, the software renames its associated copied filter with the name of the surface style rule and prefixes the style rule name with "Copy of".

## Remove a surface style rule from the workspace

1. Click **Format > Surface Style Rules**.
2. Select one or more rules to remove from the **Workspace** list.
3. Click **Remove**.

**NOTE** Removing a rule from the workspace does not delete the rule from the database. Removing it only deletes the rule from the list of rules that the software evaluates in this workspace.

## Remove a surface style rule from the database

1. Click **Format > Surface Style Rules**.
2. On the **Surface Style Rules** dialog box, select one or more rules to remove from the **Style rule library** list.
3. Click **Remove**.

**NOTE** Removing a rule from the database deletes it from the workspace also.

## Modify a surface style rule

1. Click **Format > Surface Style Rules**.
2. Select a style rule in the **Style rules library** list.
3. Click **Modify**.
4. If you want to change the rule name, type a new name in the **Rule name** box on the **Surface Style Rule Properties** dialog box.
5. Change other properties of the rule, such as the filter or the applied surface style.

**NOTE** If you want a surface style applied to the workspace, select the rule in the **Style rule library** box, and click **Add** to add it to the **Workspace** box.

## Surface Style Rules Dialog Box

Provides options to do the following:

- Select an existing surface style rule from the library and add it to the workspace.
- Modify an existing surface style rule in the library and add it to the workspace.
- Create a new surface style rule and add it to the library and the workspace.
- Delete a surface style rule from the library or the workspace.
- Rearrange the style rules in the workspace box of the **Surface Style Rules** dialog box by using the **Move Up** and **Move Down** commands.

### Style rule library

Lists all the current surface style rules in the Site database.

### Selected rules

Lists all the names for the surface style rules currently assigned to the workspace.

**Add**

Adds the selected surface style rule to the workspace.

**Remove**

Removes a selected surface style rule from the workspace. To remove a surface style from the workspace, you select the style in the **Workspace** list, and then click **Remove**.

**Move Up**

Moves the selected style rule up one step in the **Workspace** list.

**Move Down**

Moves the selected style rule down one step in the **Workspace** list.

**New**

Activates the **Surface Style Rule Properties** dialog box on which you can create a new surface style rule and add it to the database. This button is available only if you have write permission to the surface style rules.

**Modify**

Activates the **Surface Style Rule Properties** dialog box on which you can modify an existing surface style rule and add it to the database.

**Copy**

Creates a copy of the selected rule on the Clipboard. You use **Copy** to create a copy of a surface style rule in the Model database so you can modify the rule rather than create a new one.

 **NOTE** If you try to copy a style rule associated with a deleted filter, the style cannot be copied. A message box displays.

**Paste**

Pastes the copied rule from the Clipboard so it can be modified.

**Delete**

Removes the selected Surface Style Rule from the database.

**Apply**

Applies changes in surface style rules to the workspace.

 **NOTE** Double-clicking a surface style rule also activates the **Surface Style Rule Properties** dialog box on which you can create or modify a surface style rule if you have permission.

**See Also**

*Add a Surface Style Rule to the Workspace* (on page 325)

*Copy a Surface Style Rule from One Model to Another* (on page 325)

*Create a Surface Style Rule* (on page 324)

*Modify a Surface Style Rule* (on page 326)

*Remove a Surface Style Rule from the Database* (on page 326)

*Remove a Surface Style Rule from the Workspace* (on page 326)

## Surface Style Rule Properties Dialog Box

Selects a filter and a surface style to be used for the objects identified by the filter. This dialog box appears when you click **New** or **Modify** or double-click a surface style rule on the **Surface Style Rules** dialog box. You can also use this dialog box to rename a rule after you use the Copy and Paste capabilities on the **Surface Style Rules** dialog box. Paste creates a rule named **Copy of RuleName**.

### Topics

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## Surface Style Rule Properties Tab (Surface Style Rule Properties Dialog Box)

Creates or modifies a surface style rule. Surface style rules are based on filters. When you create new rules or modify rules, you specify a filter on which to base the rule. For more information on filters, see *Select by Filter* (on page 354).

### Rule name

Specifies the name of the surface style rule.

### Filter

Identifies the filter used within the style rule. The filters available are the ones defined for the current database. The list in the drop-down includes the last 10 filters selected. Selecting **Create New Filter** in the drop-down list displays the **New Filter Properties** dialog box so you can define a new filter for the style rule. Selecting **More** in the drop-down displays the **Select Filter** dialog box. For more information on selecting a filter, see *Select Filter Dialog Box* (on page 366). The **Properties** button for this field displays the Property dialog for the selected filter. For more information on defining a new filter or reviewing properties, see *Filter Properties Dialog Box* (on page 368).

**TIP** We recommend that you use simple, asking, and compound filters with style rules. The use of SQL filters could result in significant performance degradation and should be avoided wherever possible. Unlike the other types of filters, the software runs the query associated with an SQL filter directly on the database. For each object passed to the SQL filter, the software checks to see if any of the objects was returned by the query. However, there are times that modification of the object changes whether or not the object passes the SQL filter. For example, a pipeline might pass the SQL filter before it is assigned to a different system. After the system assignment changes, a different style rule is applied. Hence, some SQL filters may not always afford the gate-keeping behavior one would expect and could, in fact, result in decreased efficiency in assessing the project data model.

### Style applied

Specifies the surface style to be used for the objects identified by the selected filter. The list in the drop-down includes all surface styles available for the current database. The **Properties** button displays the **Surface Style Rule Properties** dialog box so you can edit the style as needed. For more information, see *New/Modify Style Dialog Box* (on page 315)

### Select all aspects to which the style will be applied

Shows a checkbox list of all aspects defined by the model reference data. You can check multiple aspects. Shift-select toggles the checkbox settings for multiple rows. By default, all aspects are selected.

### NOTES

- An aspect is a geometric area or space related to an object. The aspect represents information about the object, such as its physical shape or the space required around the object. Aspects are associated parameters for an object, representing additional information needed for placement. Aspects can represent clearances for safety or maintenance, additional space required during operation, or simple and detailed representations of the object. You define aspects when you model a part class for the reference data.
- The **Simple Physical** aspect includes primitive shapes. The space could be a field junction box displayed in both the model and in drawings. When you publish 3D Model Data documents, this is the default aspect used if no other aspects are selected for the document properties.
- The **Detailed Physical** aspect provides a more detailed view of equipment in the model. For example, certain types of equipment may include legs and lugs. You select the **Simple Physical** aspect to create a less cluttered view of the object, showing only the body of the equipment. However, the **Detailed Physical** aspect shows all the graphical details associated with the equipment.
- The **Insulation** aspect shows an area around a piece of equipment indicating insulation is present. For example, a 4-inch pipe with insulation might look like an 8-inch pipe when the **Insulation** aspect is selected.
- The **Operation** aspect includes the area or space around the object required for operation of the object. This space shows in the model but not in drawings. The **Operation** aspect leaves enough space around a motor for a person to operate the motor.
- The **Maintenance** aspect includes the area or space around the object required to perform maintenance on the object. This space may appear in the model but not in drawings. The **Maintenance** aspect leaves enough space around a motor to perform maintenance on the motor, including space to remove the motor, if necessary.
- The **Reference Geometry** aspect allows you to construct or add graphical objects that do not participate in interference checking. For example, a reference geometry object could be the obstruction volume for a door on a field junction box. Another example is a spherical control point.

### See Also

[Modify a Surface Style Rule \(on page 326\)](#)  
[Surface Style Rule Properties Dialog Box \(on page 328\)](#)

## Configuration Tab

Displays the creation, modification, and status information about an object.

 **NOTE** You cannot define the filters using the **Configuration** tab.

### Plant

Displays the name of the model. You cannot change this value.

**Permission Group**

Specifies the permission group to which the object belongs. You can select another permission group, if needed. Permission groups are created in Project Management.

**Transfer**

Reassigns ownership of the selected model objects from their current permission group to another satellite or host permission group. This option is only available if the active model or project is replicated in a workshare configuration. The option is not available if all of the objects in the select set already belong to another location and are non-transferable. For more information, see *Transfer Ownership Dialog Box* in the *Common User's Guide*.

 **NOTE** The **Transfer** option does not apply to the filters and surface style rules.

**Approval State**

Specifies the current status of the selected object or filter. The display depends on your access level. You might be unable to change the status of the object. The list is defined by the ApprovalStatus codelist.

 **NOTE** You can only edit or manipulate an object with a status of **Working**.

**Status**

Specifies the location of the object in the workflow process. Changing this property sets the **Approval State**. The list is controlled by the ApprovalReason codelist in the ApprovalReason.xls file. You must bulkload this file. For more information, see *ApprovalReason* in the *Reference Data Guide*.

**Date Created**

Specifies the creation date of the object.

**Created by**

Specifies the name of the person who created the object.

**Date Last Modified**

Specifies the date when the object was last modified.

**Last Modified by**

Specifies the name of the person who last modified the object.

## SECTION 9

# Tools Menu

The **Tools** menu provides commands for setting software options, showing and hiding objects, and displaying objects by filter. It also provides access to **PinPoint** and measure-related tools. You can add objects to the SmartSketch list, run reports, check interferences, and access custom commands. Some of the commands on this menu may change depending on the active task.

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## Recompute Objects

Updates the selected objects. You can use this command to recompute the geometry of objects at any time.

This command is available in the Compartmentation, Molded Forms, Planning, Structural Detailing, and Structural Manufacturing tasks.

### **Recompute Objects Ribbon**

Sets options for updating the selected objects using the **Tools > Recompute Objects** command.



### **Choose Business Object Types**

Displays the **Choose Business Object Types** dialog box, which allows you to specify which object types you want to update. For more information, see the *Choose Business Object Types Dialog Box* (on page 333).

 **Select**

Specifies objects in the current workspace.

**Finish**

Saves the changes to the Model database. The software displays a message when this operation is complete.

 **Reject**

Cancels the selected objects and allows you to continue the selection step.

 **Accept**

Accepts the selected objects, provides a graphic preview, and computes the changes. The software displays a message when the compute operation is complete.

**Commit changes after processing**

Specifies when to save the changes to the Model database: after processing all business objects, after processing each class of objects, or after processing each business object. If you specify to process all the objects and then commit, the performance will be faster, but if there is a failure on any object, or if the computer runs out of memory, the entire set of objects fails. It is recommended to commit after each object if the number of objects is large.

## Recompute objects

1. Select **Tools > Recompute Objects**. This command is available in the Compartmentation, Molded Forms, Planning, Structural Detailing, and Structural Manufacturing tasks.
2. On the ribbon, click **Choose Business Object Types** , and specify which types of objects to update.
3. Select objects in the graphic view.
4. Click **Accept** , and the software computes the changes.
5. Click **Finish**.

*The software commits (saves) the changes to the database.*

 **NOTE** Using the dropdown box at the far right of the ribbon, you can specify at which points the software saves the changes: after processing all the business objects, after processing each class of object, or after processing each individual business object.

## Choose Business Object Types Dialog Box

Specifies which types of business objects you want to update. This dialog box is broken down into groups of objects by task.

You can click **Clear All** at the bottom of this dialog box to clear all selections on all the tabs.

### **Topics**

Struct Detail Tab (Choose Business Object Types Dialog Box) ...	333
Planning Tab (Choose Business Object Types Dialog Box) .....	333
Struct Manufacturing Tab (Choose Business Object Types Dialog Box) .....	333
Compartmentation Tab (Choose Business Object Types Dialog Box) .....	333

### ***Struct Detail Tab (Choose Business Object Types Dialog Box)***

Provides a list of Structural Detailing business objects to update. Select the types of objects you want to update.

### ***Planning Tab (Choose Business Object Types Dialog Box)***

Provides a list of Planning business objects to update. Select the types of objects you want to update.

### ***Struct Manufacturing Tab (Choose Business Object Types Dialog Box)***

Provides a list of Structural Manufacturing business objects to update. Select the types of objects you want to update.

### ***Compartmentation Tab (Choose Business Object Types Dialog Box)***

Provides a list of Compartmentation business objects to update. Select the types of objects you want to update.

## Submit Batch Job

Allows you to select a batch job to submit immediately or at a scheduled time. Select **Tools > Submit Batch Job** to open the **Batch** dialog box. This command is available in the Compartmentation, Molded Forms, Planning, Structural Detailing, and Structural Manufacturing tasks.

### NOTES

- For more information about SmartPlant Batch Services, see the *Batch Services User's Guide* and the *Batch Services Quick Start Guide*.
- For information on installing SmartPlant Batch Services and setting up the batch queues, see *Installing SmartPlant Batch Services* in the *Intergraph Smart™ 3D Installation Guide*.
- The Structural Manufacturing task also has a separate command for processing batch jobs. This command is limited to filtering on a block, assembly, or the entire Model database. For more information, see *Batch Service Manager Command* in the *Structural Manufacturing User's Guide*.

## Submit a batch job

1. Click **Tools > Submit Batch Job**.  
*The Batch dialog box appears.*
2. In **Select a filter**, select **More** to use an existing filter or **Create New Filter**. The filter must contain all Model items that you want to process with the batch job. For more information, see *Select by Filter* (on page 354).
3. Select the needed batch process.
4. Click **Submit**.  
*The Schedule [Task] dialog box displays.*
5. In the **Schedule [Task]**, dialog box, schedule the batch job. For more information, see *Schedule [Task] Dialog Box* (on page 336).

## Batch Dialog Box (Submit Batch Job)

Displays the options available for the **Submit Batch Job** command.

### Select a filter

Opens the **Select Filter** dialog box. Select **More** to use an existing filter or **Create New Filter** to create a new filter. Items in the model meeting the filter criteria are included in the selected batch process. For more information, see *Select by Filter* (on page 354).

### Details Parts

Details root plate and profile parts in the selected filter. This is the batch version of the process performed by the **Execute Detailing**  command in the Structural Detailing task. For more information, see *Execute Detailing Command* in the *Structural Detailing User's Guide*.

### Un-details Parts

Removes detailing on root plate and profile parts in the selected filter. This is the batch

version of the process performed by selecting detailed parts clicking **Delete** . For more information, see *Remove Detailed Parts from Plate and Profile Systems* in the *Structural Detailing User's Guide*.

### Generate Manufacturing Parts

Creates wireframe parts (with manufacturing data) of detailed plate and profile parts in the selected filter. This is the batch version of the processes performed by the **Manufacturing Plate**  and **Manufacturing Profile**  commands in the Structural Manufacturing task. For more information, see *Manufacturing Plate Command* and *Manufacturing Profile Command* in the *Structural Manufacturing User's Guide*.

### Generate XML Output Files

Creates external data exchange files for manufacturing plate and profile parts in the selected filter. This is the batch version of the process performed by the **Tools > Output MFG Data** command in the Structural Manufacturing task. For more information, see *Manufacturing Plate Command* and *Output MFG Data Command* in the *Structural Manufacturing User's Guide*.

### MSM Update

Updates manufacturing items based on changes made to the model. This is the batch version of the Update process performed by the **Manufacturing Service Manager**  command in the Structural Manufacturing task. For more information, see *Manufacturing Plate Command* and *Manufacturing Service Manager Command* in the *Structural Manufacturing User's Guide*.

### Update Reporting

Updates the **Out-of-Date Reporting** To Do list records. This is the batch version of updating To Do list records using the **Update To Do Records** tab on the **Delay Operations** dialog box in the Molded Forms task. For more information, see *Update To Do Records Tab (Delay Operations Dialog Box)* in the *Molded Forms User's Guide*.

### Submit

Submits the batch job to the **Schedule [Task]** dialog box. For more information, see *Schedule [Task] Dialog Box* (on page 336).

### Cancel

Closes the **Batch** dialog box and cancels the **Submit Batch Job** command.

### See Also

*Submit Batch Job* (on page 334)  
*Submit a Batch Job* (on page 334)

## Schedule [Task] Dialog Box

Controls parameters for submitting batch jobs immediately, scheduling them for a later time, or scheduling jobs for processing on a regular basis.

### Queue

Displays the name of the queues configured by an administrator for the job. For more information on configuring the queues, see *Configure Queues for Jobs* in the *Project Management User's Guide*.

### Run job

Specifies the frequency with which the job runs. You can schedule jobs to run once or at regular intervals (such as daily, weekly, or monthly). Depending on the job frequency that you select, additional controls display. These controls allow you to define specific scheduling information. The software only changes the scheduling controls at job submission.

### Run on

Specifies the time to start running the job.

### Options

Displays the **Optional Schedule Properties** dialog box so that you can define a start and end date. For more information, see *Optional Schedule Properties Dialog Box* (on page 337).

### Run on

Displays a calendar from which you can select the run date. This option is available when you select **Once** from **Run job**.

### Every X days

Specifies how many days should pass between job runs. This option is available when you select **Daily** from **Run job**.

### Every X weeks

Specifies how many weeks should pass between job runs. In addition, you can select on which days the job should run. This option is available when you select **Weekly** from **Run job**.

### Day X of the month

Specifies on which day of the month the job should run. This option is available when you select **Monthly** from **Run job**.

### The X Y of the month

Specifies on which day of the month the job should run. For example, you can select the last Monday of the month. This option is available when you select **Monthly** from **Run job**.

### Job Start

Notifies you by email when the job starts. Outlook must be available to use this option.

### Job Completion

Notifies you by email when the job completes. Outlook must be available to use this option.

**Job Abort**

Notifies you by email if the job aborts. Outlook must be available to use this option.

**Address Book**

Specifies the name of the person to be notified by email of the job status. Outlook must be available to use this option. You can also type the address manually. The software sends the job log files to this email address after the job finishes.

**NOTES**

- You must configure the **SmartPlant Batch Services SMTP** option on the batch server for this to work. For more information, see the *SmartPlant Batch Services* documentation.
- The WinZip application is not required on the batch server to compress any emailed attachments. The software now provides compression with functionality included in Smart 3D.

## Optional Schedule Properties Dialog Box

Controls parameters for scheduling batch jobs.

**Start date**

Specifies the date on which the job starts.

**End date**

Specifies an optional end date.

## Batch Management

Allows you to view your batch jobs and make changes.

---

**What do you want to do?**

- *Manage batch jobs* (on page 338)
- *Edit or delete batch jobs* (on page 343)
- *Configure batch processing* (on page 338) in the *Common User's Guide*
- *Remove a model from the batch server* (on page 341) in the *Common User's Guide*

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## Manage batch jobs

You can only modify or delete batch jobs that you own. You cannot change or delete batch jobs owned by others.

1. Select **Tools > Batch Management**. The **Batch Management** dialog box displays, showing the currently scheduled batch jobs with their status. For more information, see *Batch Management Dialog Box (Batch Management Command)* (on page 344).
2. Click a column header to sort the batch job table by the column definition.
3. Use the **View** menu items to **Refresh** the batch job list or toggle the **Status Bar** on or off.
4. Select one or more batch jobs, and then select **Action > Pause** to suspend the idle jobs. This command has no effect on jobs that have started processing.
5. Select one or more batch jobs, and then select **Action > Resume** to continue processing the paused jobs. This command has no effect on jobs that are already processing.
6. To cancel a batch job, select it in the table, and then select **Action > Cancel**.
7. To modify the batch schedule definition for a batch job, select it, and then select **Action > Properties**. The **Properties** dialog box displays, showing the current schedule definition. For more information on modifying the properties, see *Properties Dialog Box (Batch Management Command)* (on page 345).

**TIP** You can also right-click a batch job to display a shortcut menu for the **Pause**, **Resume**, **Cancel**, and **Properties**.

## Configure batch processing

The computer on which the batch process runs is called the batch server. The batch server is compatible with the same operating systems that are compatible with Smart 3D Workstation. You can have one or more batch server computers per site database. For more information, see *Batch Server Sizing* in the *Smart 3D Installation Guide*.

The user who initially configures the batch server must have write permissions or better on the model, the SharedContent folder, and any permission groups that access drawings.

1. Run the **Batch Server Setup** utility by double-clicking the *SetupBatchServer.exe* file, located in the *[Product Folder]\Drawings\Middle\bin* folder.
2. From the list in the **Setup SP3D Batch Server** dialog box, select all models that may use this server to process batch processing, and click **OK**.

### **TIPS**

- Use the **Select all** option to select all available servers.

- Clicking the **Select All** option when it is gray-filled clears all selections from the list.



Type the appropriate user and password information. The user account information must be the same as the account currently logged into the computer.



- Click **Apply** to update the batch server list and verify the batch server assignments to the model. The assigned batch server should be shown in the **Batch Server(s)** column.
- To configure printers for a batch server, select a batch server in the list and click .

#### NOTES

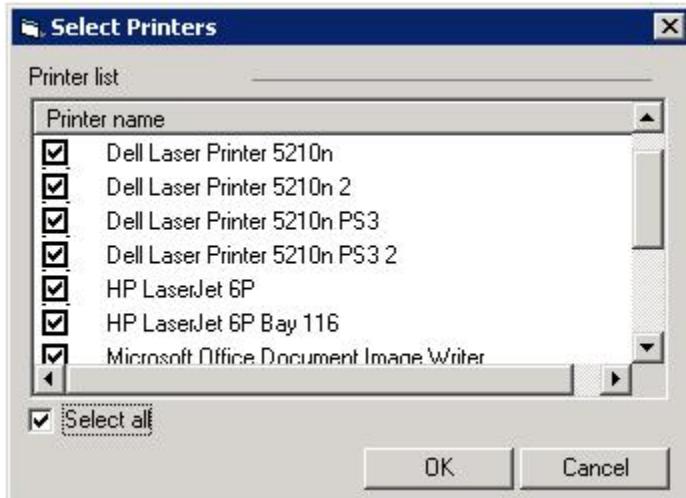
- If no printers are installed on the batch server, or if you do not associate a printer with a batch server, the batch server is not available for batch printing.
- Printers used by the batch server must also be installed on the client machine.

- The printer name on the client machine must match the printer name on the batch server.

5. On the **Select Printers** dialog box, check the printers you want associated to the batch server and click **OK**.

#### TIPS

- Use the **Select all** option to select all available printers.
- Clicking the **Select All** option when it is gray-filled clears all selections from the list.



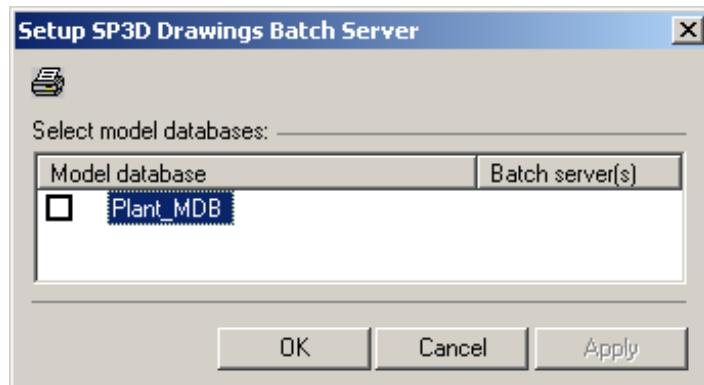
#### NOTES

- You can view all running batch processes and batch servers that are handling the processes by clicking **Tools > Batch Management**. **SmartPlant 3D Batch Management** also contains the status of all batch processes.
- After models have been assigned to the Batch Server, new processes display in the **Processes** tab of the **Task Manager** dialog box on that computer. **SmartPlant 3D Batch Management** process indicates that at least one model can use this computer as a Batch Server. For each model selected on the **Setup 3D Drawings Batch Server** dialog box, one **Batch Server** process displays in the list. If the **SmartPlant 3D Batch Management** or **Batch Server** processes are stopped, the computer does not process batch updates.
- You can also have a **Batch Tier** process running for each of the selected models. This process is created when the **Batch Server** process finds a batch job and terminates automatically after the Batch Server has been inactive for a while.
- A user must be logged onto the **Batch Server** for it to be available to process batch updates. The **SmartPlant 3D Batch Management** process starts automatically whenever any user is logged onto the Batch Server computer but is not available when no users are logged on.
- You should set up batch processing to run as a user that has write permissions to any permission group from which a batch process can be submitted. If the write permissions do not exist, the software cannot run the batch process.
- If you remove a batch server/model assignment (uncheck it on the **Setup SP3D Drawings Batch Server** dialog box), the software also removes the batch printer associations.

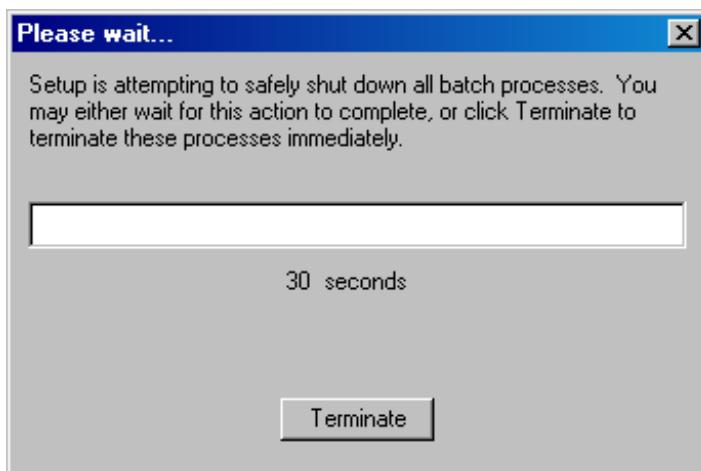
- If you have more than one batch server configured, you cannot assign certain drawings to a particular batch server. The batch servers listen for new batch drawing jobs from the clients to which they are configured. New batch jobs are picked up by open batch servers arbitrarily.
- A batch job that contains several individual drawings is automatically split into several individual batch jobs. The original batch job is completed as soon as the new batch jobs are created for each drawing under the batch job assignment.
- Drawings batch process log files are stored on the batch servers. The log files created are *Drawings-Batch.log*, *DwgBatchServer.log*, and *DwgBatchTier.log*. There is no consolidated log file for a batch process that uses more than one drawings batch server. You must inspect the log files from all drawings batch servers to locate a file that is related to a particular drawing.

## Remove a model from the batch server

1. Run the **Batch Server Setup** utility by double-clicking the *SetupBatchServer.exe* file, located in the *[Product Folder]\Drawings\Middle\bin* folder.
2. From the list in the **Setup SP3D Drawings Batch Server** dialog box, clear any check boxes for models you no longer want this server to update using batch processing.



3. Click **OK** or **Apply**. A status dialog displays as the utility terminates the Batch Server process for the specified model database. It is recommended that you allow the utility to complete the shutdown process instead of terminating immediately.



#### ■ NOTES

- Do not try to stop processes from the **Task Manager**. All models are represented on the **Processes** tab as a **Batch Server** process. If you remove some models while leaving others, you cannot tell from the **Processes** tab which processes should be stopped and which should continue.
- If you remove a batch server/model assignment (uncheck it on the **Setup SP3D Drawings** **Batch Server** dialog box), the software also removes the batch printer associations.

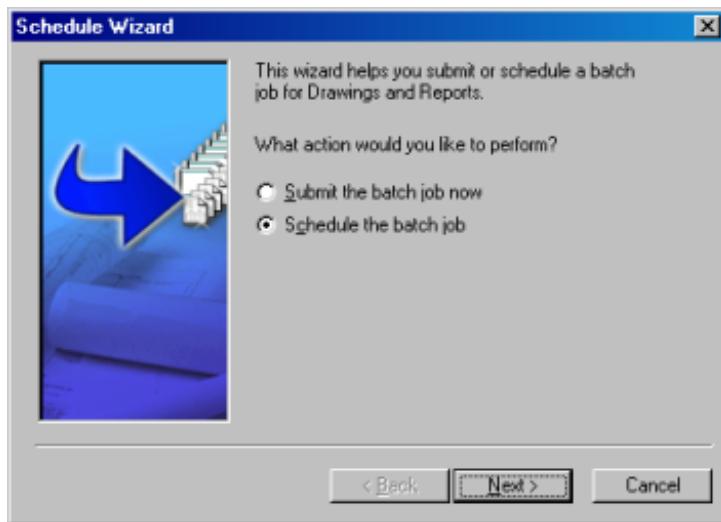
*Submit Batch Job (on page 334)*

## Edit or delete batch jobs

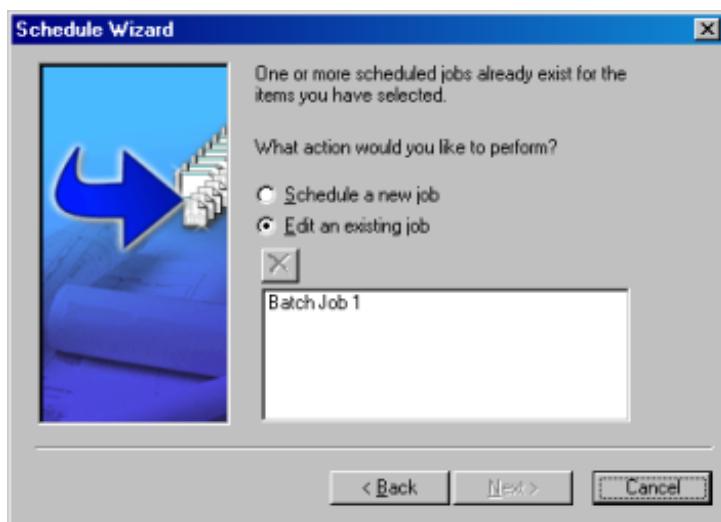
Complete the following steps to edit or delete an existing batch job.

**NOTE** You can also use **Tools > Batch Management** to update existing batch jobs. For more information, see *Manage batch jobs* (on page 338).

1. Right-click a document that has a batch job scheduled and select the batch command to run: **Update**, **Print**, or **Refresh**. The **Schedule Wizard** displays.



2. The default setting is **Schedule the Batch Job**. Click **Next** to schedule a new batch job or edit the existing batch job.



3. To edit or delete an existing batch job, select the **Edit an existing job** option. The table at the bottom of the wizard page enables.

**NOTE** To schedule a new batch job for this document, select the **Schedule new job** option and click **Next** to display the next page of the **Schedule Wizard** and create a new batch job schedule. For more information, see *Set Batch Job Frequency (Schedule Wizard)*.

4. Select a batch job in the table. To delete the batch job, click **Delete** . To edit the batch job, click **Next** to display the next page of the **Schedule Wizard** and edit the batch job properties. For more information, see Set Batch Job Frequency (Schedule Wizard).

## Batch Management Dialog Box (Batch Management Command)

Displays a list of jobs that have been submitted to the batch server, and allows you to view or manage those jobs. You can open this dialog box by selecting **Tools > Batch Management**.

 **TIP** Click a column header to sort the batch job table by the column definition.

### Job Name

Displays the name of the batch job.

### Server

Displays the name of the batch server processing the batch job.

 **NOTE** Batch jobs are submitted to a queue on the model database. The batch servers retrieve the jobs from the queue in a first-in/first-out order.

### Filter Name

Identifies the name of the filter used for the batch job. For more information, see *Batch Dialog Box (Submit Batch Job)* (on page 334).

### Request

Displays the type of the batch job request. For example, **Update** or **Print**.

### Status

Indicates the current status of the batch job. For example: **Updating**, **Submitted**, **Scheduled**, or **Printing**.

### Owner

Displays the name of the owner of the batch job.

### Submitted

Shows the date and time that the batch job was submitted or scheduled.

### Scheduled

Indicates how the batch job has been scheduled. For example: **Daily**, **Weekly**, **Monthly**, **One time only**, and so forth.

### Action Menu

#### Pause

Suspends the selected idle jobs. A job that is updating will not pause.

#### Resume

Removes the hold on the paused items. This command has no effect on jobs that are already processing.

**Cancel**

Deletes the selected jobs from the queue.

**Properties**

Displays the **Properties** dialog box for the selected job. This command is inactive if multiple jobs are selected. For more information, see *Properties Dialog Box (Batch Management Command)* (on page 345).

**View Menu****Status**

Turns the display of the status bar on/off.

**Refresh**

Refreshes the display of the batch job list.

**See Also**

*Batch Management* (on page 337)

## Properties Dialog Box (Batch Management Command)

Displays the current batch schedule for the selected batch job, and allows you to modify the schedule. You can open this dialog box by selecting **Action > Properties** in the **Batch Management** dialog box.

The information on this dialog box changes depending on the active schedule definition of the batch job. The active schedule definition is shown at the top of the dialog box.

**Schedule task**

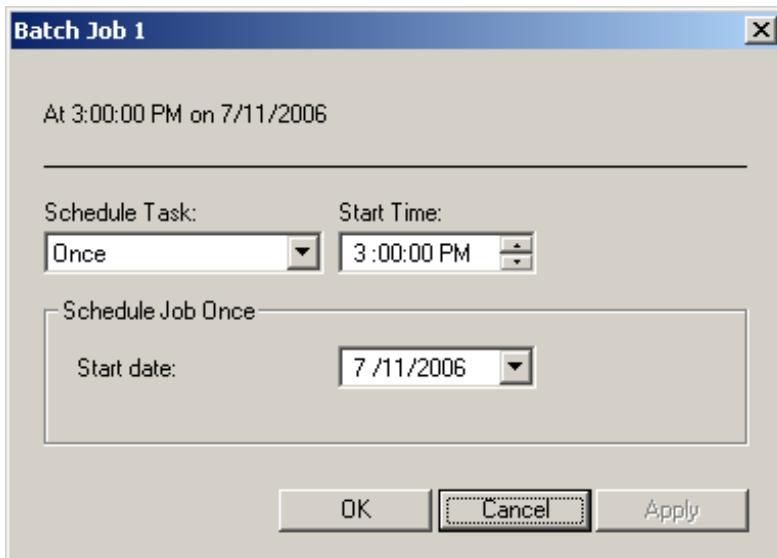
Sets the type of schedule for the task. If you change this setting, the other options on the dialog box change as well.

**Start time**

Specifies the time for the batch job to start. You can select a time using the scroll button or define a time in the format shown.

## Batch Jobs Scheduled Once

The following example shows a "once only" batch job:

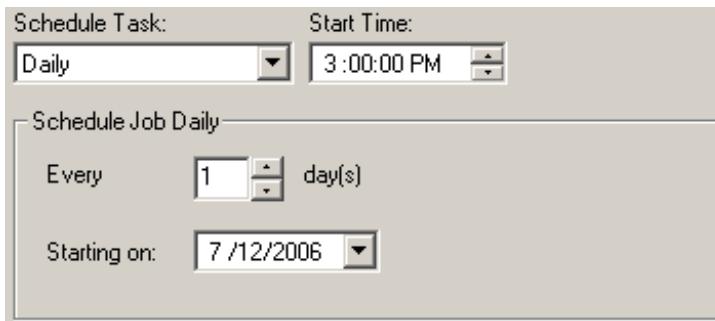


### Start date

Specifies the date on which the batch job update begins.

## Batch Jobs Scheduled Daily

If the batch job is scheduled to run daily, the **Properties** dialog box displays as follows:



### Every *count* day(s)

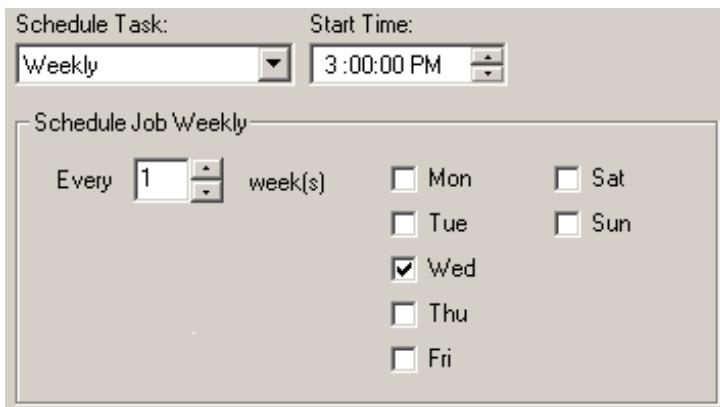
Specifies a number of days. The batch job runs once per the specified count of days. For example, if you specify **2** as the value, the batch job runs once every two days.

### Starting on

Specifies the date on which the batch job schedule begins.

## Batch Jobs Scheduled Weekly

If the batch job is scheduled to run weekly, the **Properties** dialog box displays as follows:



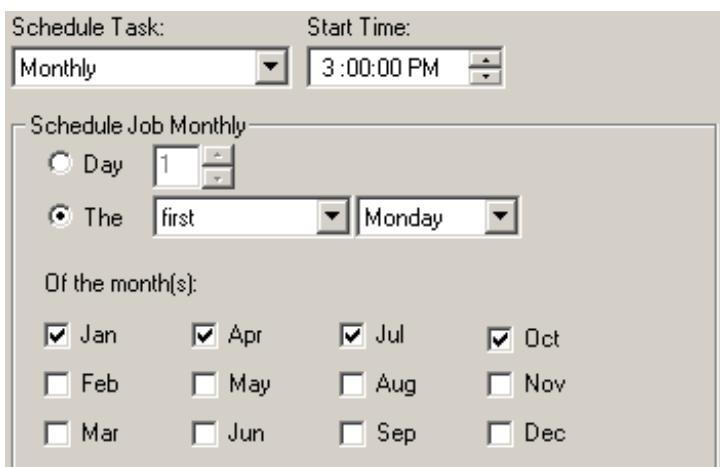
### **Every count week(s)**

Specifies a number of weeks for which the batch job will run.

You can check as many days during the week as required. The batch job runs once per day for the specified count of weeks.

## Batch Jobs Scheduled Monthly

If the batch job is scheduled to run monthly, the **Properties** dialog box displays as follows:



You use the two options to specify when the batch job runs during the month. You can check as many months as required. The batch job runs once on the specified day of the specified month(s).

### **See Also**

*Batch Management* (on page 337)

## Select

Locates one or more objects to apply a specific command. When you choose the **Select** command, the ribbon displays the default filter for the task and the **Inside**  and **Inside/Overlapping**  fence commands. The fence commands allow you to select groups of objects by drawing a dashed rectangle around them. The selectable objects are based on your existing permissions, as well as the available locate filters in that task. After you select an object or group of objects, the software replaces the selection ribbon with an edit ribbon for the select set.



### Locate Filter

Specifies a filter for the selection of specific object types. Filters allow you to select specific types of objects, or all objects. Filter options are unique for each task. Unlike the user-defined filters that you create through the **Define Workspace** command, the locate filter options are defined by the software.

#### Inside

Specifies that all objects located entirely inside the fence be selected. This setting is the default for the **Select** command.

#### Inside/Overlapping

Specifies that all objects located entirely inside the fence and those outside the fence but touching the fence at some point are selected.

### Cancelling Multi-Step Commands

You can use the **Select** command to cancel another command. For example, if you are involved in a multiple step operation such as routing a pipe, you can click the **Select** command to quit the **Route Pipe** command. Optionally, you can also press **ESC** or right-click to return to the **Select** command.

### Using Filters

When you click the **Select** command, the **Locate Filter** box displays the active filter for your task, and each task provides a unique list of available filter options. You can use these filters to:

- Control the selection of compound (or owner) objects versus selection of the constituent components. For example, in the Piping task, you have the option to locate the run, the parts, or the features of the run.
- Filter on any object in the current task.

You can apply locate filters to the highlighting and selection in both the graphic and **Workspace Explorer** views. You can also use the **Edit > Locate Filter** command to change the locate filter when you are in the middle of a command, without canceling the command.

## Selecting Graphically

Regardless of the filter you use, you can select objects using the **Fence Inside Only**  or **Fence Inside Overlap**  commands, or you can add objects to or remove objects from the select set by pressing CTRL or SHIFT and then selecting the object.

**NOTE** If you are in the SmartStep of a command, you do not need to press CTRL or SHIFT to multi-select.

When you pass the cursor over objects in the workspace, they highlight in a predefined color. When you select an object, the color changes to show that the object has been selected. You can change the colors used to distinguish highlighted and selected objects on the **Colors** tab of the **Tools > Options** dialog box.

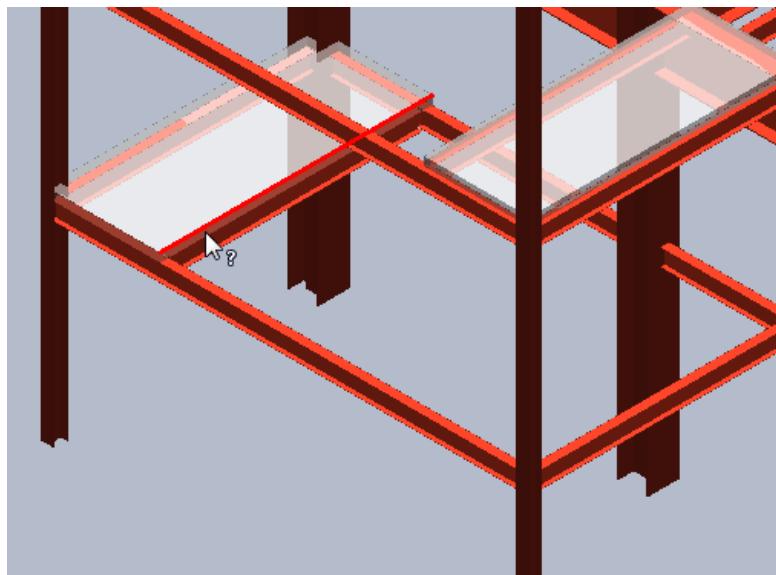
After you select one or more objects, the **Select** ribbon is replaced by another ribbon. If you are in the appropriate task to edit the selected objects, a ribbon specific to that task displays. Otherwise, the new ribbon contains only a **Name** box and a **System** list. The specific edit ribbon that appears for each object varies from one task to another. In other words, the ribbon that appears when you select a segment of pipe in the Piping task contains different lists and boxes than when you select a member in the Structure task.

### NOTES

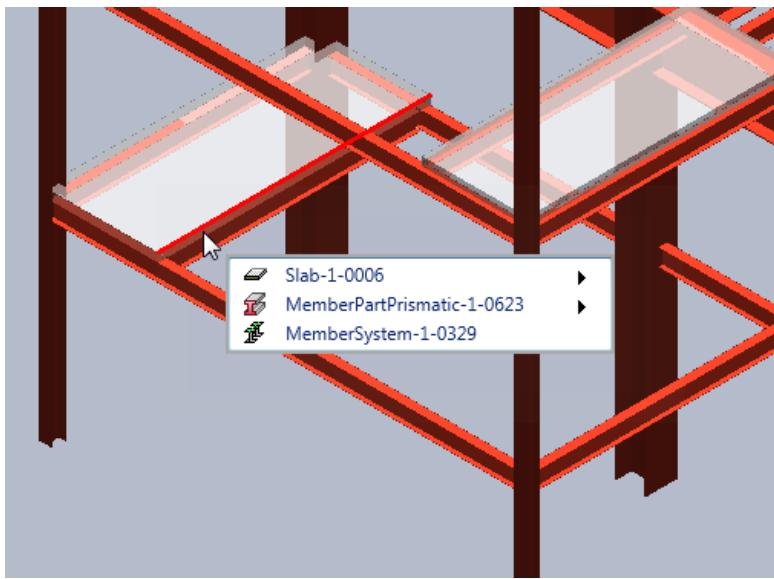
- If you select an object that has been deleted from the database or is not in the database, the software displays a message that the object cannot be found. Click **File > Refresh Workspace** to update the session.
- In addition to graphical selection, you can also select objects by clicking their names in the **Workspace Explorer**, or use **Tools > Select by Filter** to create a filter to select objects.
- You can select and delete an object from any task, as long as you have the necessary security permissions to make that change.

## Using QuickPick

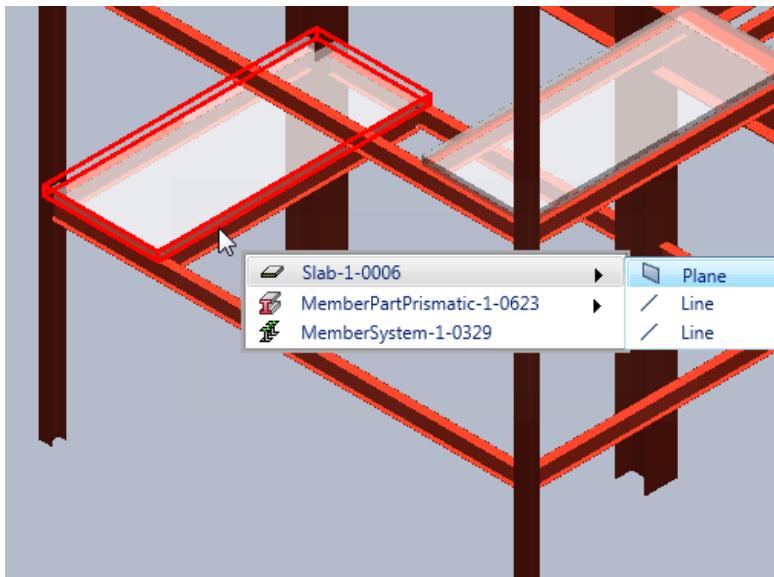
When the cursor moves over an area that contains multiple objects, the cursor changes to the **QuickPick** icon .



Single mouse click when  is displayed to activate **QuickPick** and help you select a specific object. You can also activate **QuickPick** by pressing CTRL and clicking your mouse wheel. **QuickPick** displays as a list box near your cursor location.



The **QuickPick** list displays the located model objects. Scroll your mouse wheel, or use the keyboard arrow keys, to highlight the corresponding object in the graphic view. If the software locates any nested geometric elements, it displays the ▶ icon. Click your mouse wheel to display the secondary list of the nested geometric elements.



Click an item, or click your mouse wheel again, to select the highlighted item from the **QuickPick** list.

#### **NOTES**

- Press ESC, right-click, or move your cursor away from the list to exit **QuickPick** without making a selection.

- You can use the mouse wheel to scroll through items in the **QuickPick** list.
- You can specify the number of seconds the pointer must rest on an object before the **QuickPick** feature is available. For more information, see *Set the activation time for QuickPick* (on page 507).

### What do you want to do?

- *Select objects by locate filter for a work session* (on page 351)
- *Select objects by fence for a work session* (on page 351)
- *Select objects using QuickPick* (on page 353)

## Select objects by locate filter for a work session

1. Click **Select**  on the vertical toolbar.
2. Select a filter from the **Locate Filter** list to locate only the indicated types of objects. The options that appear in this list are specific to the active task and apply to both the graphic and **Workspace Explorer** views.



3. Pass the cursor over the object that you want to select until the object highlights.
4. Click the highlighted object to accept it.
5. Click the command that you want to apply to the selected object.

### NOTES

- Some commands you can apply include: **Hide** - to exclude the objects in the active view; **Format > Style** - to change the surface style of the objects; **Format > View** - to change the way the objects appear; **Delete** - to delete all the selected objects.
- When you are working in a specific task, you can select objects in other disciplines by changing the locate filter to **All**. For example, if you are working in the Equipment task, you can set the filter to **All**, and then select and modify a structural member.

## Select objects by fence for a work session

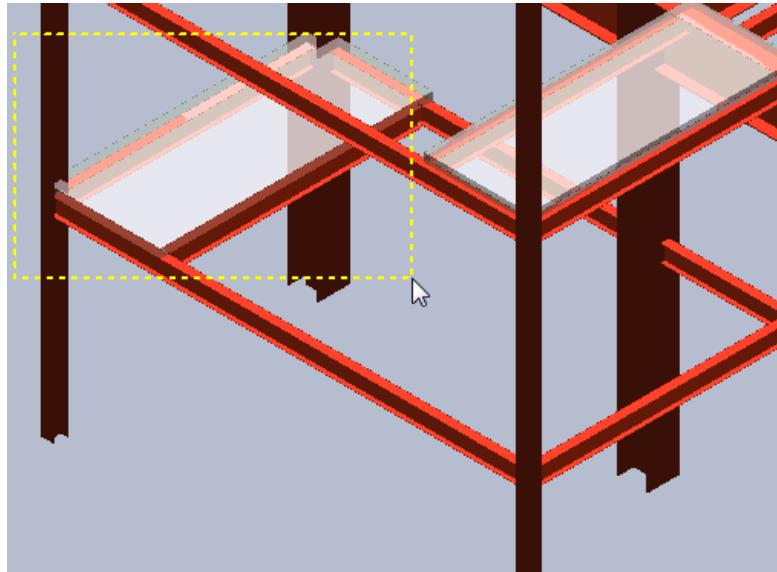
1. Click **Select**  on the vertical toolbar.
2. Select a filter from the **Locate Filter** list to locate only the indicated types of objects. The options available from this list are specific to the active task and apply to both the graphic and **Workspace Explorer** views.



3. Complete one of the following actions:

- Click the **Inside Fence**  command on the **Select** command ribbon to select all objects entirely inside the fence.
- Click the **Overlapping Fence**  command to select all objects entirely inside the fence and those objects outside but touching the fence at some point.

4. Place a fence around the objects you want to select by dragging the dashed fence lines around the objects and then releasing.



5. Click the command you want to apply to the selected objects.

#### NOTES

- Typical commands you can apply include: **Hide** - to exclude the objects in the active view; **Format > Style** - to change the surface style of the objects; **Format > View** - to change the way the objects are displayed; **Delete** - to delete all the selected objects.
- When you are working in a specific task, you can select objects in other disciplines by changing the locate filter to **All**. For example, if you are working in the Equipment task, you can set the filter to **All** and then select and modify a structural member.

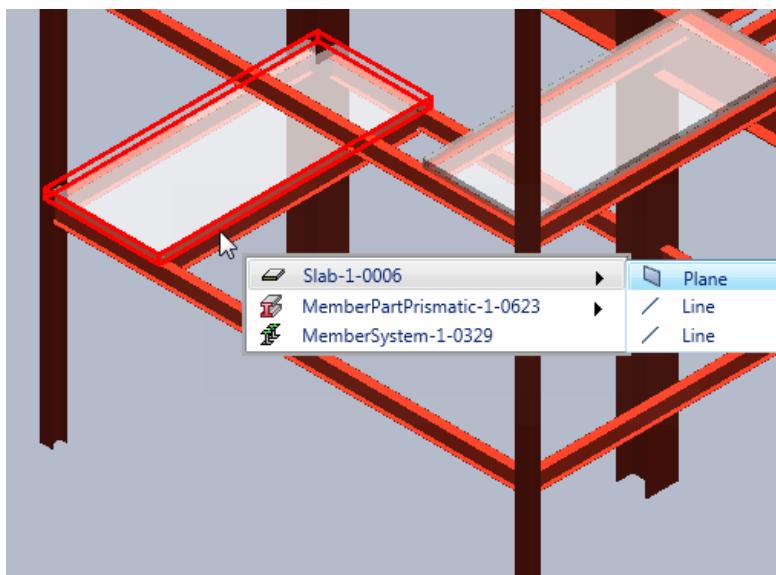
## Select objects using QuickPick

- When the cursor changes to  while you are working in the model, click the mouse to enable the **QuickPick** feature. You can also activate **QuickPick** by pressing CTRL and clicking your mouse wheel.

The software displays the **QuickPick list**, which shows the located model objects.



- Using the mouse scroll wheel, the keyboard arrow keys, or the mouse, move through the list to highlight the item in the graphic view. Click your mouse wheel to display the secondary list of the nested geometric elements.



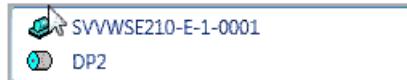
- Click a list item to select it. You can click your mouse wheel to select items without any children.

The model object becomes active in the graphic view and in the **Workspace Explorer**. The

software closes the **QuickPick** list.

#### NOTES

- Press ESC or move your cursor away from the list to exit QuickPick without making a selection.
- You can use the mouse wheel to scroll through items in the **QuickPick** list.
- Use the gray border to drag the list to another location in the graphic view.



## Select by Filter

Selects objects from the workspace using a filter. The filter queries objects in the workspace and select these to retrieve the specified objects and displays them in the workspace. You define the search criteria for the filter by selecting specific tabs on the **Filter Properties** dialog box. After the software retrieves the objects, you can apply commands such as **Copy**, **Paste**, **Delete**, and **Apply View Style** to the entire group.

The **Select Filter** dialog box allows you to create, edit, delete, and manage different types of filters in the software. This dialog box appears when you are selecting objects by filter, defining a workspace, and creating or editing surface style rules. These actions are different, but all of them use filters as part of their workflow.

## Using Filters

A filter is a set of search criteria that helps to select or retrieve data in the model. You use filters in many ways:

- Define the objects you want to include in your workspace. For more information, see *Define Workspace* (on page 45).
- Select objects based on specific criteria. For more information, see *Select by Filter* (on page 354). For example, you can use a filter to select all hot water tanks in the model, and then apply a property change to all the tanks.
- Apply surface style rules to a group of objects. For more information, see *Surface Style Rules* (on page 323).
- Create drawings and reports. For more information, see the Drawings and Reports Help.

You can create a new filter by selecting **Create New Filter** in the **Filter** box on the **Define Workspace** dialog box as you begin a new session. When at least one filter is defined for the session, you can create a new filter using the **Tools > Select by Filter** command.

Permission groups and user access levels in the software control the operations you can do with filters. For example, creating, editing, and deleting filters are subject to access control. To create filters, you must have Write permissions in the applicable permission group. To view filters, you must have a minimum of Read permission.

When filters are created, they belong by default to the permission group associated with their folder. However, you can later modify the filters to belong to a permission group other than the permission group of the parent folder.

## Filter Types

Filters are classified into different groups based on the criteria described in the following table.

**Organizing Filters** - Filters can be grouped into sub folders under three main delivered Filter Folders.

Organizing Filters	Description
Catalog Filters	<p>Shared outside the model by multiple models that use the same catalog. The filter definition must be model independent, and cannot contain model specific data such as <b>System</b>, <b>Assembly</b>, <b>Named Space</b>, <b>Permission Group</b>, <b>Work Breakdown Structure</b>, and so on.</p> <p>In general, you can reuse catalog filters with <b>Drawing View Styles</b> and <b>Surface Style Rules</b> commands, and you can also use them with the <b>Define Workspace</b> and <b>Select by Filter</b> commands. These filters are generic, and contain only metadata criteria such as object types and properties, and are shared more extensively than model filters.</p>
Model Filters	<p>Shared by all users within the model, and are saved in the model database. The filter definition can contain any model specific data. Most users have read-only permissions to model filters.</p>
My Filters (Personal Filters)	<p>A subset of model filters available only to the user who created the filter within the model. The filter definition can contain model specific data, and you can modify the definition of any filters you create. Because these are private filters, you cannot use them with the Drawing View Styles and Surface View Styles commands. However, you can use them with the Define Workspace and Select by Filter commands. My Filters contains the filters you create or modify. Personal filters are also saved in the model database.</p>

**NOTE** In a Global Workshare configuration, users in different domains who have the same login could encounter problems with write access in **My Filters**. For example, this situation can occur with hostdomain\JohnSmith at the host and satellitedomain\JohnSmith at the satellite. In this scenario, the user with write access (hostdomain\JohnSmith) should create a child folder under the original **My Filters** folder and transfer that child folder to a permission group owned by the satellite location where satellitedomain\JohnSmith has write access. This operation allows the satellitedomain\JohnSmith user in the satellite location to create filters and folders within that child folder.

**Filters Composition** - Filters are composed of simple and compound filters.

Filters Composition	Description
Simple Filters	<p>Prompts for specific values or properties. The properties you select determine the extent of your search.</p> <p>Simple filters define all the queries in one form. The default extension and restriction is sufficient to complete the search.</p>

Compound Filters	<p>Combines entire simple filters using logical conditions, such as AND, OR, or NOT to define complex queries. You can also combine any catalog filter with any predefined asking model filter and so on.</p> <p>You create compound filters in My Filters or Model Filters using constituent filters folders from Catalog Filters, Model Filters, or My Filters. The Compound Filters dialog box has <b>Union</b>, <b>Intersection</b>, and <b>Negation</b> buttons you can use to build statements.</p>
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**NOTE** Compounding is not supported on filters that have external references, such as **Reference Files** and **Reference 3D**.

**Filters Definition** - Filters can be defined using two methods.

Filters Definition	Description
Predefined Queries Filters	Uses simple filter definition with some typical predefined queries. You can select Hierarchical Queries (System, Assembly, Named Space, Permission Group, Work Breakdown Structure, Reference 3D, Reference, Analysis, and so on), Object Types Query, Properties Query, or Volume Query (or by Coordinate System Planes).
Standard Query Language (SQL) Filters	Used when predefined queries are not sufficient. You can create a query using SQL syntax. Type the query text in the <b>SQL Filter Properties</b> dialog box, and click <b>OK</b> . The <b>SQL Filter Properties</b> dialog box stores the SQL filter in the Model or the Catalog folder. The SQL filters are listed in the tree view under the appropriate parent filter folder in the <b>Select Filter</b> dialog box.

**Filters Execution** - If an asking filter is used with **Define Workspace** or **Select by Filter**, the **Filter Properties for Asking Filters** dialog box displays. The **Asking Filter – user of filter will supply value** option is selected by default when the filter is defined.

Filters Execution	Description
Asking Filter	<p>Reduces the need for multiple specific individual filters. These parametric filters prompt for specific values or selection. Filters such as Catalog or Model have an incomplete definition that requires user intervention during run time.</p> <p>Because of this behavior, you can use asking filters with <b>Define Workspace</b> and <b>Select by Filter</b>. Asking filters provide universal and flexible usage. These filters are optimal for Model filters which cannot be modified by most of the users, but can be used easily. Asking filters are identified with a green question mark.</p>
Silent Filter	Silent (non-parametric) filters are exactly opposite to Asking filters. These filters have complete definition and can be run directly, and are used in non-interactive modes such as <b>Drawing View Styles</b> and <b>Surface Style Rules</b> .

**NOTE** You can use asking filters interactively. Their use is limited in commands and features. You can use bulk filters to execute queries in batch mode or by background process. Some examples are **Surface Style Rules** with many rules using filters, or **Drawing View Styles** where filters are used for respective tests during run time.

When you create or modify a filter, you must specify the search criteria on the **Filter Properties** dialog box. The properties you select determine the extent of the search. For example, the **System**, **Assembly**, or **Named Space** tabs on the **Filter Properties** dialog box provide for extensive searches, while the **Properties**, **Volume**, **Permission Group**, and **Object Type** tabs assist with more restrictive searches. The **Configuration** tab specifies the permission group assignment of the filter. The **Work Breakdown Structure** (WBS) tab identifies objects in the selected WBS for the filter. For example, you can select projects, contracts, or documents from the WBS.

## Access control of filters

To create a new filter or filter folder or modify an existing one, you need to have write access to a permission group where you create the new filter. Unlike design objects, a new filter inherits write access to a permission group from its parent folder. By default, the **Catalog** and **Model** filter folders are assigned to their respective administrative root permission group.

## Filters - Rules of usage and limitations

The following table contains the list of available filters and their rules of usage and limitations.

Smart 3D Filters				Tab												Usage					
Organization	Composition	Definition	Execution	System	Permission Group	Assembly Space	Named Space	Analysis	Work Breakdown Structure	Reference 3D	Reference	Object Type	Properties	Volume (By System Planes)	Volume (By System Planes)	Define Workspace	Select by Filter	Surface Style Rules	Report Query	View Styles	
Catalog	Simple	SQL															Y	Y	Y	Y	Y
Catalog	Simple	predefined	Silent	N	N	N	N	N	N	N	N	Y	Y	N	N	Y	Y	Y	Y	Y	
Catalog	Simple	predefined	Asking	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N*	
Catalog	Compound	SQL															Y	Y	Y	Y	Y
Catalog	Compound	predefined	Silent	N	N	N	N	N	N	N	N	Y	Y	N	N	Y	Y	Y	Y	Y	
Catalog	Compound	predefined	Asking	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N*	
Model	Simple	SQL															Y	Y	Y	Y	Y
Model	Simple	predefined	Silent	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Model	Simple	predefined	Asking	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N*	
Model	Compound	SQL															Y	Y	Y	Y	Y
Model	Compound	predefined	Silent	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Model	Compound	predefined	Asking	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N*	
My Filters (Personal)	Simple	SQL															Y	Y	N	N	N
My Filters (Personal)	Simple	predefined	Silent	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	
My Filters (Personal)	Simple	predefined	Asking	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	
My Filters (Personal)	Compound	SQL															Y	Y	N	N	N
My Filters (Personal)	Compound	predefined	Silent	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	
My Filters (Personal)	Compound	predefined	Asking	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	

(\*)Some View Style filters (for New/Existing/Future symbology) that can be queried on the WBS tab.

## What do you want to do?

- *Create a new filter folder* (on page 358)
- *Create a new filter* (on page 359)
- *Create a new asking filter* (on page 361)

- *Create a new SQL filter* (on page 361)
- *Create a new compound filter* (on page 362)
- *Rename a filter folder* (on page 363)
- *Rename a filter* (on page 363)
- *Move a filter* (on page 364)
- *Copy a filter* (on page 364)
- *Delete a filter folder* (on page 364)
- *Delete a filter* (on page 365)
- *Edit filter properties* (on page 365)
- *Select objects by filter* (on page 365)

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## Create a new filter folder

1. Open the **Select Filter** dialog box.  
**TIP** You can either click **Tools > Select by Filter**, or select **More** from the **Filter** list in the **Define Workspace** dialog box or the **Surface Style Rule** properties.
2. Complete one of the following actions:
  - To create a new folder under **Model Filters**, select **Model Filters**, and click **New Folder**.
  - To create a new folder under **My Filters**, select **My Filters**, and click **New Folder**.
3. Click **New Folder**  on the **New Filter** dialog box.
4. Click **OK**.
5. Type a unique name for the new folder on the **Select Filter** dialog box.
6. Press **ENTER** to create the folder.

### NOTES

- You cannot create new folders under the **Model Filters** folder unless you have permission.
- The typical purpose for creating a new folder is to place one or more filters within it. You can place your filters in the folder before you exit the **Select Filter** dialog box. Otherwise, click **Cancel** to exit the **Select Filter** dialog box without applying a filter to the view. The new folder remains in the tree view.

## Create a new filter

1. Open the **Select Filter** dialog box.

**!TIP** You can either click **Tools > Select by Filter**, or select **More** from the **Filter** list in the **Define Workspace** dialog box or the **Surface Style Rule** properties.

2. Click **New Filter**  to create a new filter. Make sure you select the type of filter from the following filters.
  - a. Select **Catalog Filters** or sub folder under that node to create a new catalog filter.
  - b. Select **Plant Filters** or sub folder under that node to create a new plant filter.
  - c. Select **My Filters** or sub folder under that node to create a new personal filter.

**!TIP** To create a new filter under **My Filters** folder, click **File > Define Workspace**, or press **CTRL+W**. In the **Plant** list, click the model in which you want to work. In the **Filters** list, click **Create New Filter**.

3. Type a name for the new filter in the **Name** box.

**!TIP** Filter names must be unique within the folder. You can have a filter in your **My Filters** folder with the same name as a filter in another folder. If you move a filter into a folder that already contains a filter of the same name, the software adds a numeric suffix to the filter name to keep the filter names unique.

4. Specify the filter search queries using one or more of the tabs on the **New Filter Properties** dialog box.
5. Select the **Include nested objects** option if you want the search to include all objects within a category. Otherwise, you must separately select each category and individual object.
6. Use the **System** tab to navigate the tree list to the systems to include in the query. These systems include the model root at the highest point of the hierarchy, as well as all subsystems, and specific types of objects. Select the **Include nested objects** option, if you want to include all objects under specified System nodes.
7. Use the **Assembly** tab to navigate the tree view and select the assemblies to include in the search. Select the **Include nested objects** option, if you want to include all objects under specified Assembly nodes.
8. Use the **Named Space** tab to indicate the named spaces and drawing volumes to include in the search. Select the **Include nested objects** option, if you want to include all objects under specified Space nodes.

### **!TIPS**

- A named space is a volume in the model, like a fire or blast zone.
- A drawing volume defines the clipping volume associated with a specific drawing view in a document.

9. Use the **Analysis** tab to select structural analysis models to include in the search. Select the **Include nested objects** option, if you want to include all objects under specified Analysis entities.
10. Use the **Work Breakdown Structure** tab to identify components in the Work Breakdown Structure to include in the search. Select the **Include nested objects** option, if you want to include all objects under specified WBS items.

11. Use the **Permission Group** tab to navigate the tree list for selecting the permission groups to include in the search.
12. Use the **Object Type** tab to restrict the query to the specific object types with the list of disciplines.
13. Use the **Volume** tab to restrict selection. Choose between two options for volume search. Select **Named Spaces** to designate the named spaces to include. Select **Planes** to specify certain reference planes or coordinate locations to define the six sides of a box. For objects contained in the volume inside this box, the software includes these objects in the filter.
14. Use the **Properties** tab to restrict the search using properties of objects in the data model. For example, you can choose to match all properties listed in the grid, match any property listed in the grid, or use an operator, like equal (=) to narrow the search.

### 💡 TIPS

- The **Select Properties** dialog box browses the data model to select properties on types. In the **Property** column, click **More**.
- The **Select Object Type** dialog box specifies an object type for a property. You access this dialog box by clicking **More** in the **Object type** box on the **Select Properties** dialog box.

15. Use the **Reference 3D** tab (if available) to include any attached reference 3D models, folders or files in the query.
16. Use the **Point Cloud** tab (if available) to include any point cloud objects in the query.
17. Click **OK** on the **New Filter** dialog box to save the new filter and apply it to the selected objects in the workspace.

### 📝 NOTES

- Use the **Configuration** tab to designate the options and configuration information for the filter. You can specify filter status and the associated permission group. These settings have no effect on the objects that the search returns. They govern the access permissions on the filter itself.
- An asking filter can have specific selection of filter definitions excluded, but have the **Asking Filter - user of filter will supply value** selected. You can specify these values when you use the filter. For more information about creating an asking filter, see *Create a new asking filter* (on page 361).
- A compound filter combines two or more filters by using an operator, such as **not**, **union**, or **intersection**, between the filters to explain the relationship between the filters. For more information about creating a compound filter, see *Create a New Compound Filter* (on page 362).

## Create a new asking filter

Asking filters are constructed to prompt, or ask for specific values or selection by the user during run time. Because of this behavior, asking filter can be used by **Define Workspace** or **Select by Filter** commands. Alternatively, they provide universal and flexible usage. These filters are optimal for Model filters which cannot be modified by most of the users, but can be used easily. These filters also eliminate the need for creation of typical ad hoc filters under **My Filters**.

To create an Asking filter, refer the instructions provided in the *Create a new filter* (on page 359) section.

**★IMPORTANT** Make sure that you select the **Asking Filter - user of filter will supply value** option while defining the filter query on the required tab.

### NOTES

- When you apply the asking filter, the software displays the **Filter Properties** dialog box to specify the search criteria. Also, the software sequentially presents each tab for which you selected the **Asking Filter - user of filter will supply value** option when you created the filter. You select values to define the filter at runtime. For example, you selected the **Asking Filter - user of filter will supply value** option on the **System** and **Permission Group** tabs when you created the filter.
- When you apply the filter, the **Filter Properties** dialog box opens. You must select some systems from the hierarchy on the **System** tab and permission groups from the hierarchy on the **Permission Group** tab.

## Create a new SQL filter

1. Open the **Select Filter** dialog box.  
**💡TIP** You can either click **Tools > Select by Filter**, or select **More** from the **Filter** list in the **Define Workspace** dialog box or the **Surface Style Rule** properties.
2. Select a location in the tree view to place the SQL filter.  
**💡TIP** You can add the SQL filter in the **Catalog Filters**, **Model Filters**, or **My Filters** folder, or move the filter after you create it.
3. Click **New SQL Filter** .
4. On the **Filter Properties** dialog box, type the name that you want to assign to the SQL filter in the **Name** box.  
**💡TIP** Filter names must be unique within the folder. You can have a filter in your **My Filters** folder with the same name as a filter in another folder. If you move a filter into a folder that already contains a filter of the same name, the software adds a numeric suffix to the filter name to keep the filter names unique.
5. Type the SQL statements in the **Text of SQL query** box.

### NOTES

- If you use SQL or Oracle reserved keywords in your query, you must place square brackets [ ] around the words. Also, if you include spaces in property names, you must place brackets around the names.

- You can use SQL filters inside compound filters. A compound filter combines two or more filters by using an operator, such as **not**, **union**, or **intersection**, between the filters to explain the relationship between the filters.

## Create a new compound filter

1. Open the **Select Filter** dialog box.  
**TIP** You can either click **Tools > Select by Filter**, or select **More** from the **Filter** list in the **Define Workspace** dialog box or the **Surface Style Rule** properties.
2. On the **Select Filter** dialog box, copy the existing filters you want to use to construct the compound filter.
3. Click **New Compound Filter** .
4. On the **New Compound Filter** dialog box, type the name for the new filter in the **Name** box.  
**TIP** Filter names must be unique within the folder. You can have a filter in your **My Filters** folder with the same name as a filter in another folder. If you move a filter into a folder that already contains a filter of the same name, the software adds a numeric suffix to the filter name to keep the filter names unique.
5. Click **Add to String** to place the filter name in the text box at the bottom of the **New Compound Filter** dialog box. To build the filter string, use the operator buttons for a union, intersection, the not operator, and parentheses for priorities in sequencing.

**TIP**

- For example, if you want a string that builds a filter to include objects found by both the **Company\_Filter1** and **Company\_Filter2**, and you want all of the objects found by **Gate\_Valve\_0902**, one of your personal filters, then the statement reads **(Company\_Filter1 and Company\_Filter2) or Gate\_Valve\_0902**.
- To remove a filter or a SQL operator from the compound filter definition, click the filter or operator in the text box, and then click **Delete** or press **Backspace**.

6. To review the properties of a filter, select the filter name in the query statement and click **Properties** on the **New Compound Filter** dialog box. Also, you can right-click the filter in the tree view of the **Select Filter** dialog box and click **Properties**. The **Compound Filter Properties** dialog box opens.

**TIP** After you click **OK**, the **Select Filter** dialog box opens and now includes the new compound filter in the tree view.

### NOTES

- A compound filter combines two or more filters by using an operator, such as **not**, **union**, or **intersection** between the filters to explain the relationship between the filters.
- You can create a compound filter in the **My Filters** folder or **Model Filters** folder using constituent filters folders from any of the **Catalog Filters**, **Model Filters**, or **My Filters** folders. Command buttons such as Union, Intersection, and Negation are available on the **Compound Filters** dialog box for assistance in building statements.
- You must use the **and** operator together with the **not** operator. Do not use the **not** operator by itself. The following example shows the correct syntax: Create a new Model filter and select the root node for the Model on the **System** tab. Name the filter **All System**. Create another Model filter and select a part (a unit) from the **Model** list on the **System** tab. Name

this second filter **Part Unit**. In the **Filter** box, click **More**. In the **New Filter** section, click **Compound** and select the **All System** filter. Type the following string: **All System AND NOT Part unit**.

## Rename a filter folder

1. Open the **Select Filter** dialog box.  
**TIP** You can either click **Tools > Select by Filter**, or select **More** from the **Filter** list in the **Define Workspace** dialog box or the **Surface Style Rule** properties.
2. On the **Select Filter** dialog box, select the folder you want to rename.
3. Click **Rename** .
4. Type the new name for the folder.
5. Press **ENTER**.

### NOTES

- You cannot rename Model filters unless you have permission.
- Click **Cancel** to exit the **Select Filter** dialog box. The folder you renamed remains in the tree view.

## Rename a filter

1. Open the **Select Filter** dialog box.  
**TIP** You can either click **Tools > Select by Filter**, or select **More** from the **Filter** list in the **Define Workspace** dialog box or the **Surface Style Rule** properties.
2. Select the filter you want to rename on the **Select Filter** dialog box.  
**TIP** You cannot rename filters in the **Model Filters** folder unless you have permission.
3. Click **Rename** .
4. Type a new name for the filter.  
**TIP** Filter names must be unique within the folder. You can have a filter in your **My Filters** folder with the same name as a filter in another folder. If you move a filter into a folder that already contains a filter of the same name, the software adds a numeric suffix to the filter name to keep the filter names unique.
5. Click elsewhere in the view on the dialog box to save the new name.

**NOTE** Click **Cancel** to exit the **Select Filter** dialog box. The filter you renamed remains in the tree view.

There are several commands available in the right-click shortcut menu when renaming a filter. Below is a list of shortcut commands:

- **Cut** - Cuts the selected text to the Clipboard.
- **Copy** - Copies the selected text to the Clipboard.
- **Paste** - Inserts the Clipboard contents. This command is enabled after you copy text.
- **Delete** - Removes the selected text.

## Move a filter

1. Open the **Select Filter** dialog box.

**💡 TIP** You can either click **Tools > Select by Filter**, or select **More** from the **Filter** list in the **Define Workspace** dialog box or the **Surface Style Rule** properties.

2. In the **Select Filter** dialog box, click the folder you want to move and drag it to the target folder.

**💡 TIP** You cannot move a filter unless you have the required permissions.

**⚠ NOTE** When you move a model filter to the Catalog Filters folder, all of the model-specific definitions are removed and the model filter is changed to an asking filter. This restricts its usage to interactive only.

## Copy a filter

1. Open the **Select Filter** dialog box.

**💡 TIP** You can either click **Tools > Select by Filter**, or select **More** from the **Filter** list in the **Define Workspace** dialog box or the **Surface Style Rule** properties.

2. In the **Select Filter** dialog box, CTRL+ click and drag the folder you want to copy to the target folder.

**💡 TIP** You can also use the shortcut menu **Copy** and **Paste** commands to copy the filter. You cannot copy a filter unless you have the required permissions in the target folder.

**⚠ NOTE** When you copy a model filter to the Catalog Filters folder, all of the model-specific definitions are removed and the model filter is changed to an asking filter. This restricts its usage to interactive only.

## Delete a filter folder

1. Open the **Select Filter** dialog box.

**💡 TIP** You can either click **Tools > Select by Filter**, or select **More** from the **Filter** list in the **Define Workspace** dialog box or the **Surface Style Rule** properties.

2. Select the filter folder you want to delete, and click **Delete** .

**💡 TIP** You cannot delete a **Model Filters** folder unless you have permission.

### **NOTES**

- You can also press the **DELETE** key to delete objects.
- When you delete a filter folder, you remove it from the tree view. The software does not prompt you about deleting the contents of a folder. Therefore, if you delete a folder, you delete all the filters within that folder.

## Delete a filter

1. Open the **Select Filter** dialog box.  
**TIP** You can either click **Tools > Select by Filter**, or select **More** from the **Filter** list in the **Define Workspace** dialog box or the **Surface Style Rule** properties.
2. Select the filter you want to delete, and click **Delete** .

**TIP** You cannot edit a Model filter unless you have permission.

### NOTES

- You can also press the **DELETE** key to delete objects.
- You cannot delete filters from the **Model Filters** folder or **Catalog Filters** unless you have permission.

## Edit filter properties

1. Open the **Select Filter** dialog box.  
**TIP** You can either click **Tools > Select by Filter**, or select **More** from the **Filter** list in the **Define Workspace** dialog box or the **Surface Style Rule** properties.
2. Select the filter you want to edit from the tree view, and click **Properties** .

**TIP** You cannot edit a Model filter unless you have permission.

3. Choose one or more tabs on the **Filter Properties** dialog box that contains the search criteria you want to edit.
4. Specify the selection properties on each tab.  
**TIP** Some of the tabs on the **Filter Properties** dialog box expand the query, while other tabs restrict the query. For more information, see *Filter Properties Dialog Box* (on page 368).

**NOTE** If the filter name is modified, you are prompted either to create a new filter with new name and modified definition or to just rename the modified filter.

## Select objects by filter

1. Open the **Select Filter** dialog box.  
**TIP** You can either click **Tools > Select by Filter**, or select **More** from the **Filter** list in the **Define Workspace** dialog box or the **Surface Style Rule** properties.
2. On the **Select Filter** dialog box, select an existing filter, or create a new one.  
**TIP** When you are using the **Select by Filter** command, if you define a filter that results in a blank set, the following message appears: **No objects will be selected as no objects in the workspace meet filter criteria.**
3. Click **OK**.

### NOTES

- The list displays these types of filters: catalog filters, Model filters, and personal filters. Choose from any of the filters.

- In the **My Filters** list, you can maintain your own filters and modify them for ad-hoc filter definition.
- You can select multiple filters by holding down the SHIFT and CTRL keys.

## SQL Queries in SQL Server and Oracle

In Smart 3D, all Microsoft SQL Server and Oracle SQL syntax differences are handled internally, so you need not be concerned with the differences. The delivered filters work on both Microsoft SQL Server and Oracle. In addition, all SQL-based report query templates include the tag <ORASQL>, which defines the Oracle-specific version of that query. This tag has no impact on SQL Server users.

However, if you write your own direct queries for filters and report templates, you must be familiar with the syntax differences between SQL Server and Oracle. Both vendors have extended the SQL language.

Here are a few notable syntax differences. This list is not comprehensive.

- Temporary tables - In Microsoft SQL Server, temporary tables can be created and referenced dynamically within an SQL statement. In Oracle, the temporary table must exist prior to the statement that references it.
- Internal functions - Both SQL Server and Oracle have many built-in functions for string manipulation, date formatting, numerical tasks, and so forth. The function names may be different for the same functionality.
- With Oracle 9i and above, the join syntax is the same so that should not be an issue for migration from SQL Server to Oracle.

**★IMPORTANT** Refer to the corresponding (Microsoft SQL Server or Oracle) documentation for more information about the best methods of writing SQL statements.

## Select Filter Dialog Box

Creates, edits, deletes, and selects filters for use with the **Define Workspace**, **Surface Style Rules**, and other **Select by Filter** commands, including Project Management's **Model Data Reuse** (MDR), Drawings View Styles, and Reports commands that require runtime filter selection. You can access this dialog box in several ways.

- Select **File > Define Workspace**, and select the **More** option in the **Filter** box.
- Select **Format > Surface Style Rules**, click **New** or **Modify**, and then select the **More** option in the **Filter** box.
- Select **Tools > Select by Filter**.

The tree view displays the following types of filters:

- **Catalog Filters** - These filters are used to reference data in the Catalog. For example, a catalog filter could apply to company-wide operations. Your administrator can define Company\_Filter\_1, Company\_Filter\_2, and so forth.
- **Model Filters** - These filters are available to everyone assigned to a specific model database. There are delivered catalog filters to query on the different types of model objects. You must have the appropriate privileges to create, edit, or delete these filters.
- **My Filters** - These are personal filters that you create and place in the **My Filters** folder. They are visible only to you, the owner. You cannot see the personal filters of others, and

they cannot see your personal filters. Select a filter from one of the listed filters, or create a new filter to meet your specific requirements.

#### **New Folder**

Creates a new folder.

#### **New Filter (Simple or Asking)**

Displays the **New Filter Properties** dialog box so that you can create a new filter. Asking filters allow you to specify the parameters of the search. An asking filter has built-in functionality to ask for values (with boxes that you are required to supply). The values apply to properties that you have already designated you will supply when the filter runs. Asking filters are portable between models.

**NOTE** Model Data Reuse (MDR) does not support asking filters. The only valid filter types for an MDR transaction are System, Permission Group, Object Type, Volume and Properties. You can define the filter on any one of these tabs or in a combination using multiple tabs.

#### **New Compound Filter**

Displays the **New Compound Filter Properties** dialog box, which you use to create a new compound filter containing the Or, And, or Not operators. Compound filters are not supported for MDR.

#### **New SQL Filter**

Displays the **New SQL Filter Properties** dialog box, in which you can type the text of an SQL query. SQL filters are not supported for MDR

#### **Delete**

Removes a filter or folder from the **Select Filter** list. If you delete a folder, the software also deletes its contents.

#### **Rename**

Changes the name of an existing filter or folder from the **Select Filter** list.

#### **Properties**

Displays the **Filter Properties** dialog box so that you can select the properties that determine your filter search criteria.

#### **NOTES**

- If this dialog box is activated from the **Select by Filter** command, you can select multiple filters on this dialog box. Hold CTRL or SHIFT, and click each filter. When you click **OK**, all objects that fit the selected filters are selected.
- If this dialog box is activated from the **Select by Filter** command, it clears the select set before adding objects to the select set.

#### **See Also**

*Select by Filter* (on page 354)  
*Select Objects by Filter* (on page 365)

## Filter Properties Dialog Box

Builds a filter or displays the properties of an existing filter. You access this dialog box from the **Select Filter** dialog box, which is available as follows:

- **File > Define Workspace - Filter** option, or **Properties** button, if a filter is selected.
- **Tools > Select by Filter**.

This dialog box is entitled **New Filter Properties** or simply **Filter Properties**, depending on whether you are creating a new filter or modifying an existing filter. Its behavior is the same.

The dialog box tabs let you pick the appropriate criteria for the filter. For example, the **System**, **Assembly**, or **Named Space** tabs on the **Filter Properties** dialog box provide for extensive searches, while the **Properties**, **Volume**, **Permission Group**, and **Object Type** tabs assist with more restrictive searches. The **Configuration** tab specifies the permission group assignment of the filter. The **Work Breakdown Structure** (WBS) tab identifies objects in the selected WBS for the filter. For example, you can select projects, contracts, or documents from the WBS.

### Name

Specifies the name of the object. If a **Name Rule** is specified, then the software uses that rule to determine this name. If the **Name Rule** value is **User Defined**, then you must type a name in this box.

### Asking Filter - user of filter will supply value

Creates an asking filter. An asking filter prompts you for specific values for certain properties.

### Include nested objects

Specifies whether you want your search to include all objects under a selected node. For example, when you check this box and then select an object, the software selects all sub-objects under that object. If you do not check this box, you can select objects separately. This option is unavailable for certain tabs on this dialog box.

### Lock CTRL key

This option changes the selection mode and allows you to select multiple items across filter tabs without holding down the CTRL key.

### Clear All

Removes the object definition. Click **Clear All** if you want to start over and redefine the search criteria.

### NOTES

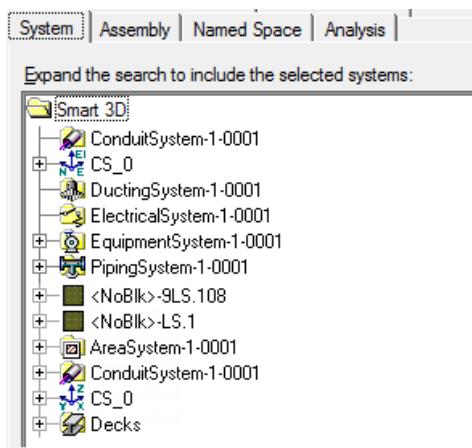
- When the **New** dialog box displays, the default is always the last-selected option.
- When you double-click a filter on the **Select Filter** dialog box, the software applies the filter and dismisses the dialog box.

## Topics

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## **System Tab (Filter Properties Dialog Box)**

Provides a tree view list of all the available systems you can include in your filter search criteria. A Model is the highest system in the hierarchy and includes all subsystems. Systems can span disciplines and include many types of objects.

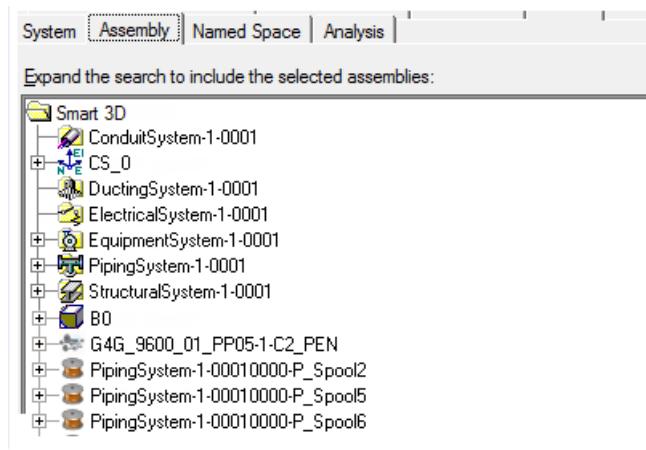


You can select the **Include nested objects** option to specify that you want your search criteria to include all objects within a system. For example, if you select this option, the software selects all children objects when you select a parent system. If you do not select this option, you select only the systems. You can also use the CTRL and SHIFT keys to select multiple objects on this tab.

Nodes with more than 1,000 children display in bold type rather than auto-expanding if some of their children are selected in the filter properties. The selected child nodes highlight when you expand the parent node.

## Assembly Tab (*Filter Properties Dialog Box*)

Provides a tree view list of all the available assemblies you can include in your filter search criteria.



You can select the **Include nested objects** option to specify that you want your search criteria to include all objects within a category. For example, if you select this option, the software selects all objects when you select a category. If you do not select this option, you select the assembly objects separately. You can also use the CTRL and SHIFT keys to select multiple objects on this tab.

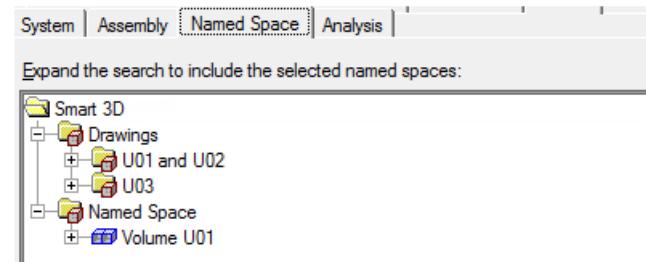
The **Include nested assemblies only** option includes all nested assemblies, assembly blocks, blocks, spools, and penetration spools under the selected assemblies, but not the parts.

### NOTES

- The **Include nested assemblies only** option explicitly includes the assemblies and assembly parents that you are working on so that the **Refresh Workspace** command updates the assembly information without including all of the parts nested under the selected assemblies, such as plate parts, that are not of interest.
- You can only select one of the **Include nested objects** and **Include nested assemblies only** options. You can clear both options.

## Named Space Tab (*Filter Properties Dialog Box*)

Provides a list of all the named spaces and drawing volumes you can include in your search.



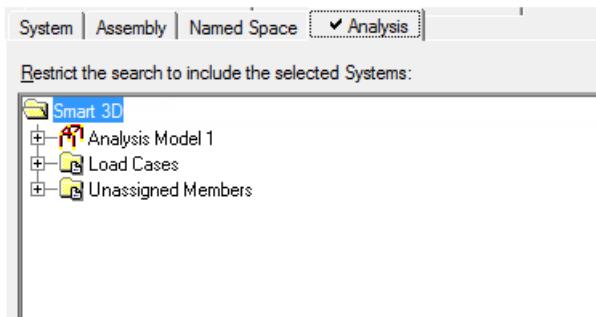
Named spaces are regions in the model, like fire or blast zones. Filtering on named spaces is useful particularly when you work in the Space Management task and need to see the size,

shape, and position of the named spaces that already exist. Drawing volumes are used in the Drawings and Reports task in the drawing creation process.

You can select the **Include nested objects** option to specify that you want your search criteria to include all objects within a category. For example, if you select this option, the software selects all objects when you select a category. If you do not select this option, you select the category and individual objects separately. You can also use the CTRL and SHIFT keys to select multiple objects on this tab.

## **Analysis Tab (Filter Properties Dialog Box)**

Provides a list of all the structural analysis models you can include in your search.

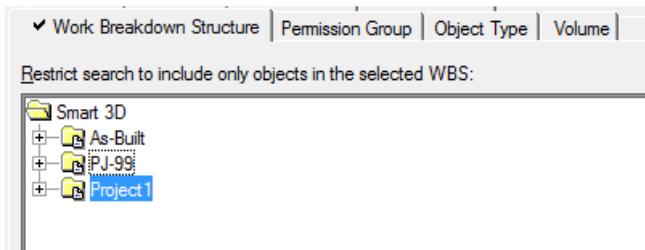


Analysis models are associated with the Structural Analysis task in the software. An analysis model is a non-graphical and logical grouping of member systems that can be sent to a third-party analysis and design solver package.

You can select the **Include nested objects** option to specify that you want your search criteria to include all objects within a category. For example, if you select this option, the software selects all objects when you select a category. If you do not select this option, you select the category and individual objects separately. You can also use the CTRL and SHIFT keys to select multiple objects on this tab.

## **Work Breakdown Structure Tab (Filter Properties Dialog Box)**

Browses a tree view of the model work breakdown structure to include WBS entities only if the **Work Breakdown Structure** tab is used, or restrict the filters to objects assigned to the selected WBS, if other tabs are used.



**NOTE** A simple filter shows only objects assigned to the selected WBS items and the WBS items themselves. To see WBS objects on the **Workspace Explorer** tab, you must create a compound filter. If you define a filter that contains only one WBS project, this filter returns the WBS project selected on the **WBS** tab of the **Workspace Explorer** and any objects assigned to that particular WBS project on the **Systems** tab in the **Workspace Explorer**. To see all WBS

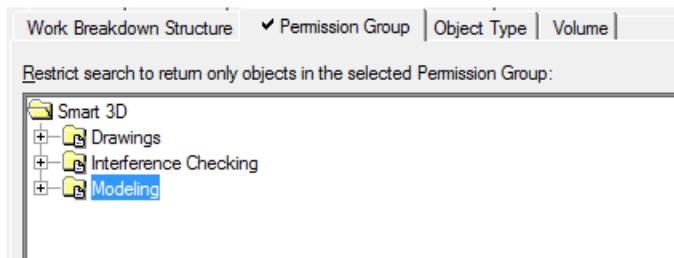
objects on the **WBS** tab in the **Workspace Explorer**, you must create a compound filter. For example, you might create a filter that contains All Systems or WBS Objects. This filter would return all objects on the **Systems** tab and all WBS objects.

The WBS is the breakdown of the Model by the construction work to be performed. The breakdown can consist of the Model at the top level, as well as projects, contracts, and documents. You can modify a property for an object to associate it to a project. You can associate published documents to a contract and then reassign the document from one contract to another. Objects are associated to a document.

You can select the **Include nested objects** option to specify that you want your search criteria to include all objects within a category. For example, if you select this option, the software selects all objects when you select a category. If you do not select this option, you select the category and individual objects separately. You can also use the CTRL and SHIFT keys to select multiple objects on this tab.

### **Permission Group Tab (Filter Properties Dialog Box)**

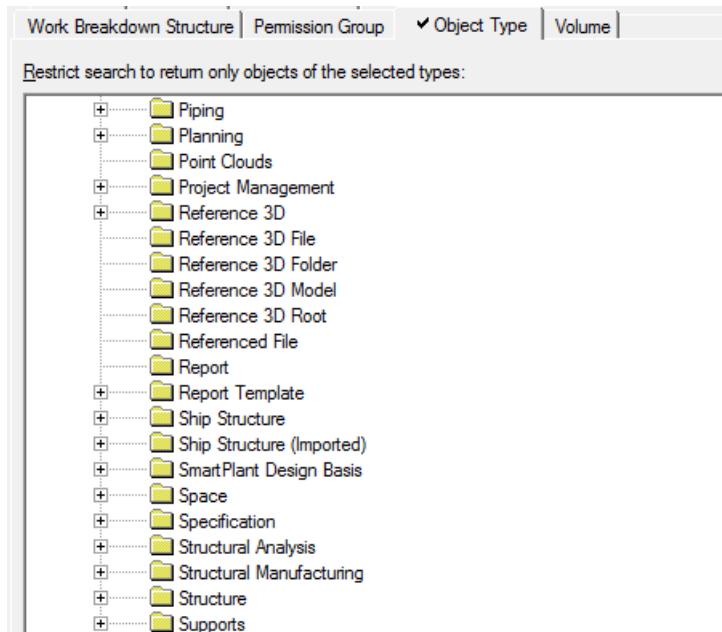
Displays a tree view list of all the permission groups that you can select for your search. The filter selects objects that belong to the groups that you highlight. If you do not highlight any groups, the filter includes all groups in the list.



You can add permission groups in the Project Management task.

## Object Type Tab (*Filter Properties Dialog Box*)

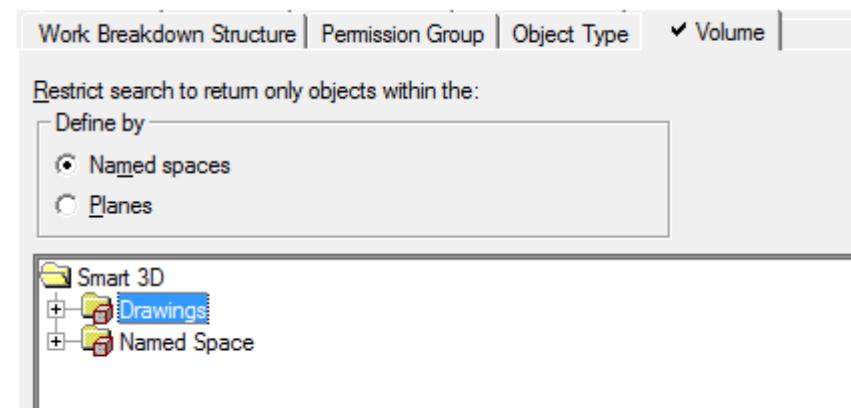
Provides options for you to select specific object types to restrict your filter. The objects are organized by discipline.



This tab provides a list of all the major object types you can include in your search. The filter selects the objects you highlight. If you do not select any objects, the filter includes all objects in the list. To include one or more object types in your filter, press CTRL and click the name of each object type that you want to include.

## Volume Tab (*Filter Properties Dialog Box*)

This tab restricts filter selection to objects within the selected volume and provides two options for defining the volume search method: **Named spaces** or **Planes**. The tree view displays the **Named Spaces** hierarchy or the coordinate system hierarchy depending on the option that you select.



## Define by

### Named spaces

Displays a tree view of the space hierarchy from which you can choose one or more spaces to include in your search. This option is useful for filtering all objects located within specific spaces. In addition to selecting all the objects inside the specified named spaces, the software retrieves the space itself. You do not need to select the object on the **Named Space** tab as well. To select a particular named space, press CTRL and click as many spaces as you want to include in your search. If you do not select any named spaces, the filter includes all objects in all named spaces.

### Planes

Displays a tree view of the reference coordinate system hierarchy in the window, and a group of first and second position coordinate boxes at the bottom. The coordinate system hierarchy is a list of predefined coordinate systems for the model, each having a different origin point. For example, one coordinate system might have an origin point at the corner of a boiler room, another at the center of the building, and so forth.

When you select one of these coordinate systems, the software displays a list of coordinate planes for that system. By selecting a plane and specifying the first and second positions along that plane, your filter selects all objects that fall between the two positions on that plane. The positions automatically appear in the first and second position boxes at the bottom of the dialog box. This option is useful when you want to select objects that are all on a specific level or plane. You can hold CTRL to select the first and second positions in the tree view.

### Coordinate system

Specifies a coordinate system. You can define coordinate systems in the Grids task.

#### 1st Position (N, E, EL) or (Y, X, n)

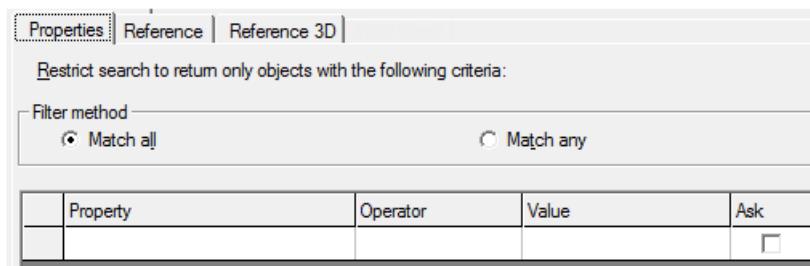
Displays the names of the planes that you select to define the first position of the volume.

#### 2nd Position (N, E, EL) or (Y, X, n)

Displays the names of the planes that you select to define the second position of the volume.

## **Properties Tab (Filter Properties Dialog Box)**

Provides options for selecting object properties that you can use to restrict your search.



### Filter Method

You can combine multiple properties on individual rows.

**Match All**

Returns only those objects matching all of the properties listed in the grid. This method is the same as using the Boolean operator AND.

**Match Any**

Returns objects matching any property listed in the grid. This method is the same as using the Boolean operator OR.

**Property**

Lists the properties of objects in the data model in the **Select Properties** dialog box. To select properties and set their data type, select **More** in the field drop-down.

**Operator**

Select an operator such as **<>** (not equal) or **=** (equal).

**NOTE** If you use a wildcard character (\*), you must use the **Contains** comparison operator. For example, pumps P-1000A and P-1000B exist in the model. To query for the pumps using properties, select **Match All** and type **Name Contains P\***.

**Value**

Specifies the value of the property.

**Ask**

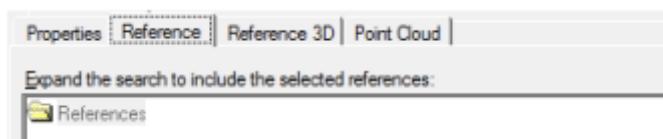
Creates an **Asking Filter** that allows you to specify a value for the property when you run the filter. The **Ask** column is so named because the software asks or prompts you to type a value. An administrator or other user with the required permissions establishes the asking filter and defines a default value. While defining a workspace, you can type a different value for the property. This is not a valid option for Model Data Reuse.

**Remove**

Removes the selected property from the grid.

**Reference Tab (Filter Properties Dialog Box)**

Provides a tree view list of the available reference files you can include in your search.



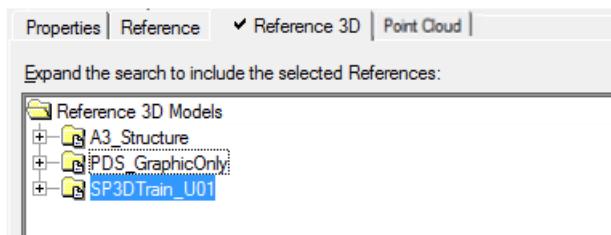
You can also use the CTRL and SHIFT keys to select multiple objects on this tab.

**NOTES**

- To view this tab, you must first insert a file using the **Insert > File** command.
- When you copy a filter that contains **Reference** tab information into the Catalog or into a different Model database, the software removes the **Reference** tab information. Because of this, you cannot create a compound filter that uses **Reference** tab information. Filters that use **Reference** tab information are hidden from the tree view on the **Compound Filter** dialog box. The compound filter ignores any **Reference** tab information.

## Reference 3D Tab (*Filter Properties Dialog Box*)

Provides a list of all the Reference 3D models you can include in your search.

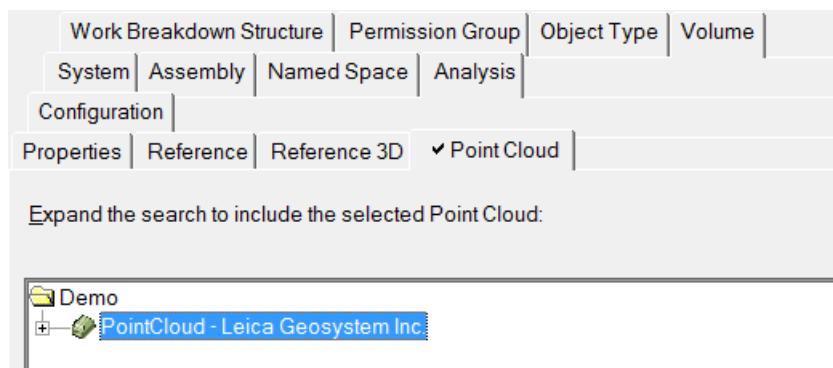


You can also use the **CTRL** and **SHIFT** keys to select multiple objects on this tab.

**NOTE** When you copy a filter that contains Reference 3D tab information into the Catalog or into a different Model database, the software removes the Reference 3D tab information.

## Point Cloud (*Filter Properties Dialog Box*)

Provides a list of all the registered point cloud vendors. You can reference only one point cloud object in your search. You cannot select the parent node to filter the search.



**NOTE** To select point cloud objects for filters, you must install the point cloud vendor software and associate a point cloud model reference with the Model in the Smart 3D Project Management task.

## Configuration Tab

Displays the creation, modification, and status information about an object.

**NOTE** You cannot define the filters using the Configuration tab.

### Plant

Displays the name of the model. You cannot change this value.

### Permission Group

Specifies the permission group to which the object belongs. You can select another permission group, if needed. Permission groups are created in Project Management.

### Transfer

Reassigns ownership of the selected model objects from their current permission group to another satellite or host permission group. This option is only available if the active model or project is replicated in a workshare configuration. The option is not available if all of the objects in the select set already belong to another location and are non-transferable. For more information, see *Transfer Ownership Dialog Box* in the *Common User's Guide*.

**NOTE** The **Transfer** option does not apply to the filters and surface style rules.

#### Approval State

Specifies the current status of the selected object or filter. The display depends on your access level. You might be unable to change the status of the object. The list is defined by the ApprovalStatus codelist.

**NOTE** You can only edit or manipulate an object with a status of **Working**.

#### Status

Specifies the location of the object in the workflow process. Changing this property sets the **Approval State**. The list is controlled by the ApprovalReason codelist in the ApprovalReason.xls file. You must bulkload this file. For more information, see *ApprovalReason* in the *Reference Data Guide*.

#### Date Created

Specifies the creation date of the object.

#### Created by

Specifies the name of the person who created the object.

#### Date Last Modified

Specifies the date when the object was last modified.

#### Last Modified by

Specifies the name of the person who last modified the object.

## Compound Filter Properties Dialog Box

Builds a compound filter or views the properties of an existing filter. This dialog box appears when you click **New Compound Filter** on the **Select Filter** dialog box or when you select an existing compound filter and then click **Properties** on the **Select Filter** dialog box.

#### Compound filter name

Specifies a name for the new compound filter or displays the name for an existing compound filter.

#### Filter type

Displays the category of filters, such as **Catalog Filters**.

#### Select filter to use in compound expression

Provides a tree view to select the existing filters in the **Catalog Filters** folder you want to use for building the compound filter.

#### Add to String

Places the filter name in the text box at the bottom of the **Compound Filter Properties** dialog box. To build the SQL statement with the operator buttons on the **Compound Filter**

**Properties** dialog box, insert operators, such as a union, intersection, or the not operator, and parentheses for priorities in sequencing.

#### Properties

Reviews the properties of a filter. Select the filter name in the query statement and click **Properties**.

#### Or

Specifies or inserts the union operator at the location you indicate in the string in the text box.

#### And

Specifies or inserts the intersection operator at the location you indicate in the string in the text box.

#### Not

Inserts the not operator at the location you indicate in the string in the text box.

#### (

Specifies or inserts the left parenthesis, which starts a priority for the operators. The software inserts the parenthesis at the location you indicate in the string in the text box.

#### )

Specifies or inserts the right parenthesis, which ends a priority for the operators. The software inserts the parenthesis at the location you indicate in the string in the text box.

#### Place pointer in the text box where you want to add a filter name or operator

Instructs you to click the text box at the location to add a filter or SQL operator to the compound filter definition, and allows you to remove a filter or SQL operator from the compound filter definition.

**TIP** To remove a filter or SQL operator from the compound filter definition, click the filter or SQL operator in the text box, and then click **Delete** or press **Backspace**.

#### Delete

Removes the selected filter or operator from the compound filter definition.

#### Clear All

Removes the object definition.

**TIP** You are not required to use parentheses in a statement, but parentheses provide structure that is easier to follow, especially in a complex statement. Without the parentheses, an SQL statement follows a default order of operations. Specify **Not** operators first, followed by **And** operators and then the **Or** operators. For example, in the statement **X And Y Or Not Z**, the **Not** operator is processed first, followed by **And** and finally **Or**. To change this order, you must use parentheses.

**NOTE** Compounding is not supported on filters containing filtering criteria on Reference 3D tab.

#### See Also

*Create a new filter* (on page 359)

*Create a new filter folder* (on page 358)

*Select by Filter* (on page 354)

## SQL Filter Properties Dialog Box

Builds an SQL filter or views the properties of an existing filter. This dialog box appears when you click **New SQL Filter** on the **Select Filter** dialog box or when you select an existing SQL filter and then click **Properties** on the **Select Filter** dialog box.

### See Also

*Configuration Tab* (on page 151)  
*General Tab (SQL Filter Properties Dialog Box)* (on page 379)  
*Select by Filter* (on page 354)

### General Tab (SQL Filter Properties Dialog Box)

Specifies SQL statements for the filter.

**NOTE** If you use SQL or Oracle reserved keywords in your query, you must place square brackets [] around the words. Also, if you include spaces in property names, you must place brackets around the names.

### See Also

*Create a new SQL filter* (on page 361)  
*SQL Filter Properties Dialog Box* (on page 379)

## Folder Properties Dialog Box

Provides options to specify the name of your new folder and displays the current folder configuration.

### See Also

*Configuration Tab* (on page 151)  
*General Tab (SQL Filter Properties Dialog Box)* (on page 379)  
*Select by Filter* (on page 354)

### General Tab (Folder Properties Dialog Box)

Specifies a name for a folder.

#### Name

Specifies a name for the folder.

### See Also

*Filter Properties Dialog Box* (on page 368)

## Select Properties Dialog Box

Browses the data model and selects properties on types. You use the **Select Properties** dialog box when specifying filter properties for the workspace and when defining labels. This dialog box is accessible in both the Common task and the Drawings and Reports task.

In Common, you can access this dialog box when you use the **File > Define Workspace** command or the **Tools > Select by Filter** command to view the properties of a filter. On the **Filter Properties** dialog box, click the **Properties** tab, and in the **Property** column, click **More**. You can also access this dialog box by clicking **Tools > Options** and selecting the **ToolTips** tab. Click **Edit Tooltip**, and then click **Add** in the **Properties** section.

In Drawings and Reports, you can access this dialog box when you use the **Edit Template** command on a report template to add properties to a filter query.

### **Object type used as the basis for the property identification**

Specifies an object type. Click **More** to access the data model tree. For more information, see *Select Object Type Dialog Box* (on page 380).

### **Relationship**

Specifies a direct property or a correlation between object types. These relationship names are sorted alphabetically.

### **Related object type**

Selects another object type. Click **More** to access the data model tree.

### **Display properties in this category**

Specifies a category. You can define categories in the reference data workbooks on the Custom Interfaces sheets.

### **Select one or more properties**

Specifies properties. Press SHIFT to select more than one property.

### **See Also**

*Create a new filter* (on page 359)

*Select by Filter* (on page 354)

*Select Object Type Dialog Box* (on page 380)

## Select Object Type Dialog Box

Specifies the categories of objects, the feature type, and the component to which you want to add a ToolTip or label. This dialog box is available for multiple tasks.

In the Common task, you can access this dialog box when you are specifying an object type for filter properties. You can also access this dialog box when you are editing labels for ToolTips.

When you are working with filter properties or labels, this dialog box opens after you click **More** in the **Object type** box on the **Select Properties** dialog box. When you are working with ToolTips, the **Select Object Type** dialog box opens after you click the browse button on the **ToolTips** tab on the **Options** dialog box.

In the Drawings and Reports task, you can access this dialog box when you use the **Edit Template** command on a report template to add properties to a filter query.

In the Project Management task, you can access this dialog box when you use the **Configure Default Colors** command to add default style rules.

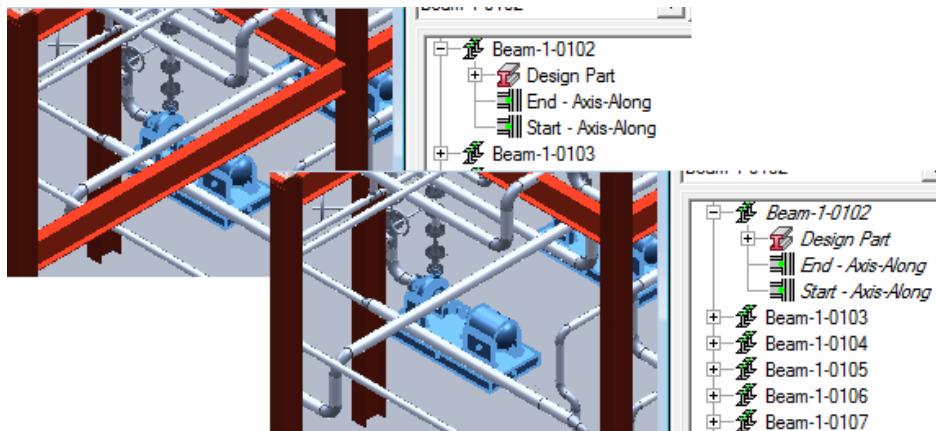
When the **Select Object Type** dialog box opens, a tree view lists categories of objects available in the software. When you double-click an object, the view expands to show the available feature types. After you select a feature type, another level is available for some categories to show the component features you can select. For example, double-click **HVAC**, double-click **HVAC Features**, and then click **HVAC Transition** as the feature, and accept the dialog box.

If objects appear in italics, you cannot select that object on this dialog box. The software uses your previous selections as the basis for this determination. *Italicized* text for objects in the **Workspace Explorer** indicates the objects are hidden with the **Show/Hide** options.

## Show

Turns on the graphical display of objects in the select set. To select a hidden object, select its name in the **Workspace Explorer**. The names of hidden objects appear in *italics* in the **Workspace Explorer**.

**NOTE** You must use **Tools > Show All** to redisplay a hidden reference 3D object.

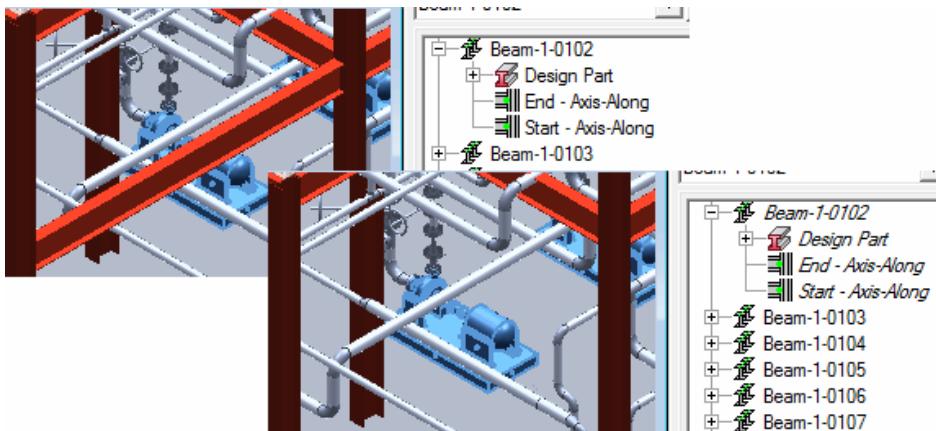


## Hide

Turns off the graphical display of selected objects in the workspace. The names of hidden objects appear in *italics* in the **Workspace Explorer**.

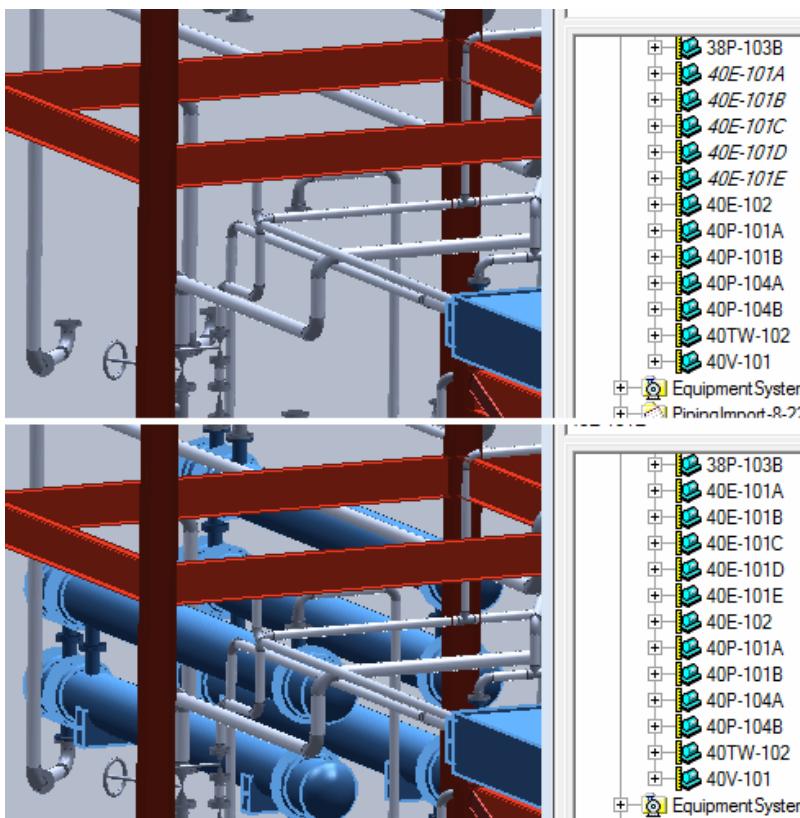
**NOTE** If you hide an object while the related tab of the **Workspace Explorer** is active, the child objects are automatically hidden. For example, if the **System** tab is active when you hide a system object, then all of the children objects are also hidden. If the related WSE tab is not

active, only the object that you specifically select is hidden. For example, if you hide a pipe run while the **Space** tab is active, the child parts of the pipe run are not hidden.



## Show All

Displays all graphically hidden objects in the workspace without having to select them individually. You must use this command to redisplay a hidden Reference 3D object.



## Exclude and Include Reference 3D Objects

The **Exclude** and **Include** commands in the **Tools** menu allow you to remove and then add back selected Reference 3D objects. The software activates **Exclude** and **Include** only for Reference 3D models that have the model type **SmartPlant Interop Publisher** or **S3D**. For more information on model type assignments for Reference 3D models, see the **Attach Reference 3D Model** section in the *Project Management User's Guide*.

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### What do you want to do?

- *Exclude Reference 3D Objects* (on page 383)
- *Create a workspace containing excluded Reference 3D objects* (on page 384)
- *Include Reference 3D Objects* (on page 386)

---

## Exclude Reference 3D Objects

### Tools > Exclude

The **Exclude** command allows you to remove or re-load selected objects in Reference 3D models having the **SmartPlant Interop Publisher** or **S3D** assigned type so that the objects are not:

- Displayed in the graphics view.
- Detected in interference checking operations.
- Shown in generated drawings (orthographic) and reports.
- Shown in data exports.
- Included in 3DModelData publish or SPRDirect publish operations.
- Included in a Reference 3D attachment update if the source identifier of the object stays the same across the updates.

The exclusion applies to Reference 3D objects on the client system and on distributed systems in a Global Workshare environment.

### Exclude a Reference 3D object:

1. Open a work session that contains Reference 3D model objects.
2. Select one or more Reference 3D objects, and then click **Tools > Exclude**.  
-OR-  
Right-click in the graphics view and select **Exclude**.

*The software removes the object from the graphics view and the corresponding hierarchy node.*

**! TIP** If you accidentally exclude an object, use **Edit > Undo Exclude** to bring the selected object back to the workspace.

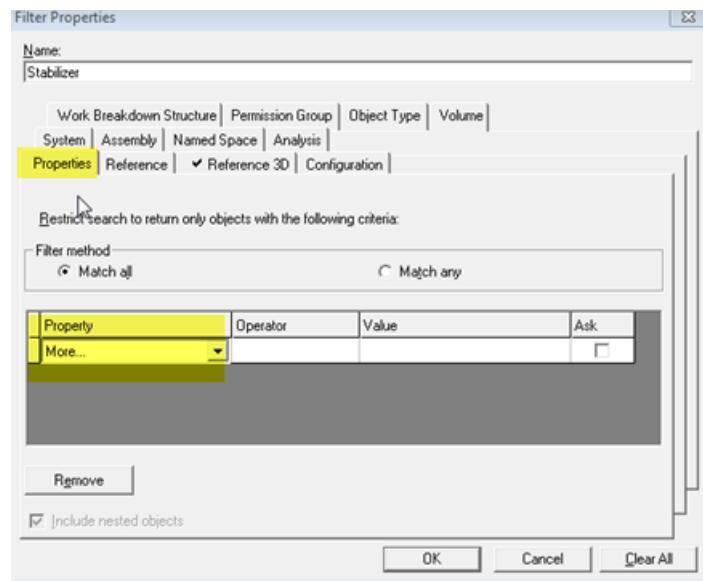
3. To see the excluded Reference 3D objects at any time, create a workspace containing only excluded Reference 3D objects. For more information, see *Create a workspace containing excluded Reference 3D objects* (on page 384).

## Create a workspace containing excluded Reference 3D objects

After you have excluded (**Tools > Exclude**) Reference 3D objects, you can create a workspace that contains only those excluded objects. This allows you to review them at any time and use **Tools > Include** to re-load any excluded Reference 3D objects into the workspace.

**NOTE** If you define a workspace with a filter that allows both included and excluded objects, the **Include** and **Exclude** commands are not available on the **Tools** menu or on the shortcut menu. You must change the filter and remove either included or excluded options for the related command to be available.

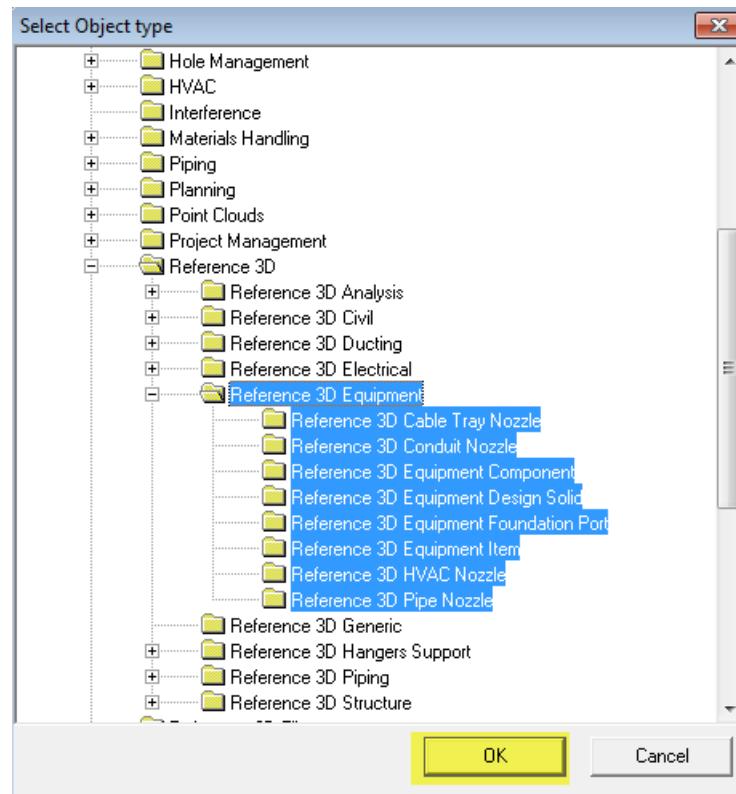
1. Click **File > Define Workspace > Properties**, and then click the **Properties** tab.



2. Select **More** from the **Property** menu list.

*The software displays the **Select Properties** dialog box.*

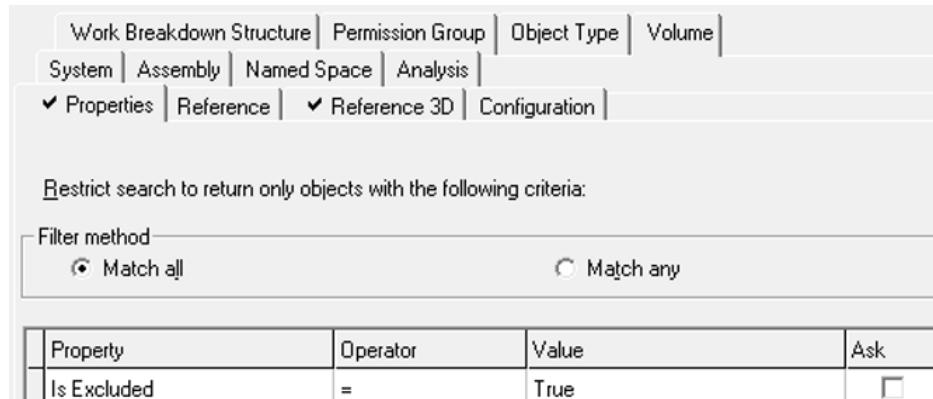
3. Select **More** for **Object type used as the basis for the property identification**, and then expand the Reference 3D node to select object types to be used as a filter.



4. Select **Standard** for **Display properties in the category**, and then select **Is Excluded** as a **Property Name**. Click **OK**.

Display properties in this category :		
Standard		
Select one or more properties :		
Property Name	Data Type	Unit Type
Approval State	ApprovalStatus	Code listed val
Date Created	Date	
Date Last Modified	Date	
<b>Is Excluded</b>	<b>Boolean</b>	

- On **Filter Properties > Properties** tab, select the equal to "=" **Operator** and set the **Value** to **True** for **Is Excluded**.



- Click **OK** to close the **Filter Properties** and **Define Workspace** dialog boxes.

*The software refreshes workspace and the excluded graphics objects display.*

### See Also

- [Exclude Reference 3D Objects \(on page 383\)](#)
- [Define a workspace using a new filter \(on page 46\)](#)

## Include Reference 3D Objects

### Tools > Include

Allows you to re-load Reference 3D objects after they have been excluded using **Tools > Exclude**. To do this, you can create a workspace that contains the excluded objects so that Smart 3D no longer treats the Reference 3D objects as excluded. You can see the Reference 3D objects in the workspace and graphics view.

- Open a workspace that contains only excluded Reference 3D objects. For more information, see [Create a workspace containing excluded Reference 3D objects \(on page 384\)](#).
- When you can see the excluded objects in the workspace, you can individually select each object in the graphics view or use the **Inside** and **Inside/Overlapping** fence commands to select multiple objects.
- Select **Tools > Include**.
  - OR-
  - Right-click to select **Include**.

**TIP** If you accidentally include an object, use **Edit > Undo Include** to keep the object excluded.
- To change the graphics view to see all available objects and not just the excluded Reference 3D objects:
  - Select **File > Define Workspace > Properties**.
  - Change the **Is Excluded** property value in the workspace to **False**.
    - OR-
    - Remove the **Is Excluded** property condition row.
  - Click **OK** to exit **Select Filter**, and then the **Define Workspace** dialog boxes.

*The software loads the graphics objects in the workspace without loading the excluded Reference 3D objects.*

## See Also

[Exclude Reference 3D Objects \(on page 383\)](#)

# PinPoint

 (Plant) or  (Ship) Helps you move, place, or modify objects with precision by displaying coordinate data at the pointer. The **PinPoint** command is located on the **Tools** menu. When you turn **PinPoint** on, the **PinPoint** ribbon displays coordinates relative to a target position you set. You can reset the target position at any time. Also, **PinPoint** provides a way to define a temporary coordinate system with a new origin and axis directions different from those of the global coordinate system.

You can use the **PinPoint** command while other commands such as **Place Equipment** are running.

## How PinPoint Works

The **PinPoint** command provides coordinate input to commands as you place objects. The coordinates are relative to a target point that you can position anywhere in a view. You can change the location of the target point at any time by clicking **Reposition Target**  on the ribbon and then clicking a new position in the view. Also, you can reposition the **PinPoint** target by pressing **F12**.

As you move the pointer around, **PinPoint** displays the distances between the pointer position and the target point. Also, these values appear on the **PinPoint** ribbon. Dashed lines show the **PinPoint** axes of the active coordinate system and the **PinPoint** orientation.

The **PinPoint** command only works on objects that have a right-handed coordinate system.

## Rectangular, Spherical, and Cylindrical Coordinates

When you use **PinPoint**, you can work with rectangular, spherical, or cylindrical coordinates. The default PinPoint mode uses **Rectangular coordinates** . Rectangular coordinates are the E, N, EL or X, Y, Z-coordinates. When using **Spherical coordinates** , you use a specified distance and angle. For example, spherical coordinates can be useful when routing pipe at a specified distance and angle. With **Cylindrical coordinates** , you set radius, height (Z), and horizontal angle (theta) values.

## Locking and Freeing Values

You can lock the coordinates using the boxes on the ribbon. When one coordinate value is locked, you can position the other coordinates by clicking a position in the view. You also can set all values using the ribbon boxes. If you want to free the dynamics for a locked value, you can clear the value box by double-clicking in the box and pressing BACKSPACE or DELETE, or by pressing the corresponding function keys.

 **NOTE** When you use spherical coordinates and lock the absolute distance, you must also lock at least one of the angle boxes on the ribbon. You cannot unlock an angle while the absolute distance is locked and no other angle is locked.

## PinPoint Orientation

In its default orientation, the axes are set by the active coordinate system. You can re-orient the axes by defining a temporary coordinate system using the **Define Coordinate System by 3 Points**  or  command on the **PinPoint** ribbon.

**NOTE** If you select a different coordinate system in **Coordinate System** box, then you must click **Set Target to Origin**  or  to set the selected coordinate system as the origin.

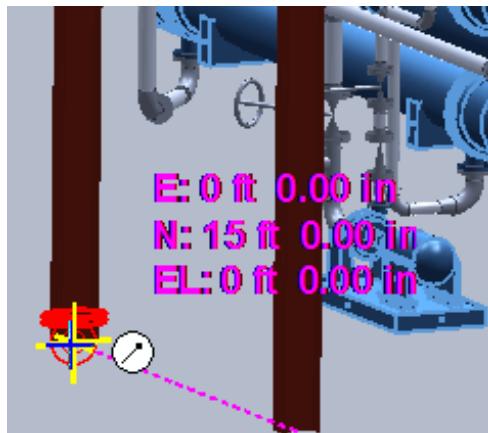
## PinPoint Ribbon

Sets options for moving or placing objects with precision.

### **Display On/Off (F9)**

Displays or hides the **PinPoint** options and distance values. The shortcut key for this option is F9.

### **Reposition Target (F12)**



Changes the location of the target point. The E (X), N (Y), and EL (Z) coordinates are relative to the previous position of the target. Also, you can reposition the **PinPoint** target by pressing F12.

### **Set Target to Origin**

Moves the target to the origin of the current coordinate system.

**NOTE** If a different coordinate system is selected in the **Coordinate System** box, you must click **Set Target to Origin** to reset the ribbon values.

### **Relative Tracking**

Moves the target to the last location you clicked. In the **Relative Tracking** mode, the **PinPoint** target follows your mouse as you click. When toggled off, the target remains locked in the same location until repositioned.

### **Properties of Active Coordinate System**

Shows the properties of the active coordinate system specified in the **Coordinate system** dropdown box. The dropdown lists the last seven coordinate systems selected and several options:

- **Global** - Specifies the current global coordinate system.
- **Select Graphically** - Allows you to specify the coordinate system graphically in the active window. Instructions appear in the status bar.
- **More** - Displays the **Select Coordinate System** dialog box. For more information, see Select Coordinate System Dialog Box.

### Coordinate system

Sets the active coordinate system. You can select the global coordinate system. Or, you can select a coordinate system in a graphic view or from a tree view of the workspace or database.



#### Define Coordinate System by 3 Points

Defines a temporary coordinate system by three points. Point 1 defines the origin of the coordinate system. Point 2 defines the end of the local x-axis. Point 3 defines the end of the local y-axis.

### Rectangular Coordinates



#### Rectangular Coordinates

Specifies the rectangular coordinates mode for the **PinPoint** command. This is the default PinPoint mode. The following settings are added to the right side of the ribbon:

- **Step** - Specifies the **PinPoint** step value, which is an incremental distance along the **PinPoint** coordinate axes. As you use **PinPoint**, your pointer snaps to locations corresponding to the step value. You can select a step value from the list in this box, or you can type your own value.
- **E or X** - Sets the distance along the E-axis or X-axis of the active coordinate system between the target point and the current pointer location to the value that you type. The shortcut key to lock/unlock this box is F6.
- **N or Y** - Sets the distance along the N-axis or Y-axis of the active coordinate system between the target point and the current pointer location to the value that you type. The shortcut key to lock/unlock this box is F7.
- **EL or Z** - Sets the distance along the EL-axis or Z-axis of the active coordinate system between the target point and the current pointer location to the value that you type. The shortcut key to lock/unlock this box is F8.

### NOTES

- Use single or double quotation marks to enclose the reference name plane. The reference plane must belong to the active coordinate system.
- Multiplication is supported. Parentheses are not supported as part of input, but the software uses standard computation operator precedence. However, expressions involving multiplication should use only one length unit. Examples include '**F13' + 2\*4m\*3**' and "**F13"-2\*3\*4m, - 3\*4cm-3m\*2+6"**.
- If an error occurs because of an invalid expression, see the *Troubleshooting Reference Guide* available from **Help > Printable Guides** for more information.

### Spherical Coordinates



#### Spherical Coordinates

Specifies the spherical coordinates mode for the **PinPoint** command. The following settings are added to the right side of the ribbon:

- **Distance** - Sets the distance between the target and the pointer location. The shortcut key to lock/unlock this box is F6.
- **Horizontal** - Sets the horizontal angle, which is measured clockwise from the N-axis or Y-axis. This angle is in the horizontal plane. The shortcut key to lock/unlock this box is F7.
- **Vertical** - Sets the vertical angle, which is measured counter-clockwise from plan horizontal. This angle is from the horizontal plane. The shortcut key to lock/unlock this box is F8.

**NOTE** When you use spherical coordinates and lock the absolute distance, you must also lock at least one of the angle boxes on the ribbon. You cannot unlock an angle while the absolute distance is locked and no other angle is locked.

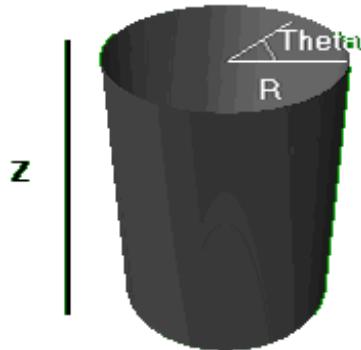
## Cylindrical Coordinates

### Cylindrical Coordinates

Specifies the cylindrical coordinates mode for the **PinPoint** command. The following settings are added to the right side of the ribbon:

- **Radius** - Sets the radius of the cylinder. The shortcut key to lock/unlock this box is F6.
- **Theta** - Sets the horizontal angle, measured from North and clockwise. The shortcut key to lock/unlock this box is F7.
- **Z** - Sets the height of the cylinder. The shortcut key to lock/unlock this box is F8.

The following graphic represents how the cylindrical measurements are set:



## Lock and Unlock

Use **Lock**  and **Unlock**  in conjunction with the settings dropdowns for the Rectangular (F6), Spherical (F7), and Cylindrical (F8) coordinates. The current state of the button indicates whether the setting is locked or not. Deleting the contents of the box automatically unlocks the setting.

## Select Coordinate System Dialog Box

Sets the coordinate system for the active command. You can define coordinate systems in the Grids task. For more information, see the *Grids User's Guide* available from **Help > Printable Guides**.

### What do you want to do?

- *Place objects using rectangular coordinates* (on page 391)
- *Place objects using spherical coordinates* (on page 393)
- *Place objects using cylindrical coordinates* (on page 395)

## Place objects using rectangular coordinates

The following procedure shows how the **Rectangular Coordinates**  option is used with the **PinPoint** command. For information on using spherical coordinates or cylindrical coordinates, see *Place Objects Using Spherical Coordinates* (on page 393) and *Place Objects Using Cylindrical Coordinates* (on page 395).

**★IMPORTANT** The **PinPoint** command only works on objects that have a right-handed coordinate system.

### Show me

1. Select a task that allows you to place objects.
2. Click any **Place <object name>** command.
3. Select an object, and then specify the necessary properties.

*The software displays the computed graphics of the selected object.*

4. On the Common toolbar, click **PinPoint**  to activate the PinPoint ribbon bar.

**◆TIP** Click **Display On/Off**  to turn the **PinPoint** display on and off. You can also press F9 to toggle the PinPoint display on and off.

5. In the **Coordinate System** box, select a coordinate system in the list as the reference point.
  - **Global** - Global coordinate system is the default option. You cannot modify a global coordinate system.
  - **Select Graphically** - Allows you to specify a coordinate system graphically in the active window. Follow the instructions that appear in the status bar.
  - **More** - Displays the **Select Coordinate System** dialog box. Select a coordinate system from the Workspace or Database.



6. After you select an active coordinate system, click **Set Target to Origin**  (plant) or  (ship).

## NOTES

- The software considers the targeted position as the new origin from which the distance will be measured. The target position does not change when you change the active coordinate system.

- The **Rectangular Coordinates**  is the default mode for **PinPoint**.

- Set the distance along **E**-axis (plant) or **X**-axis (ship), and then click **Lock/Unlock Absolute Distance**  to lock the value.



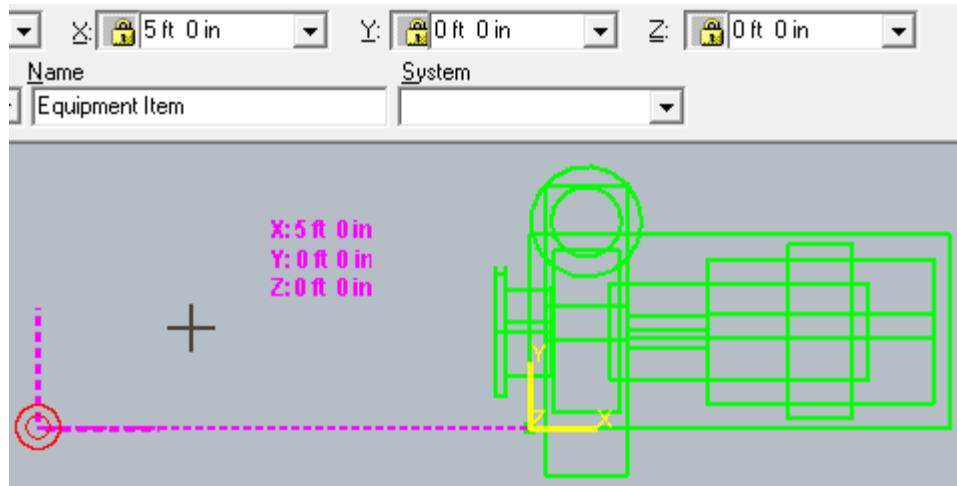
**TIP** The shortcut key to lock/unlock this value is F6.

- Similarly, set the distances along **N**-axis (plant) or **Y**-axis (ship), and **EL**-axis (plant) or **Z**-axis (ship).

**TIP** The shortcut key to lock/unlock the **N**-axis (plant) or **Y**-axis (ship) value is F7, and F8 is the shortcut key to lock/unlock **EL**-axis (plant) or **Z**-axis (ship) value.

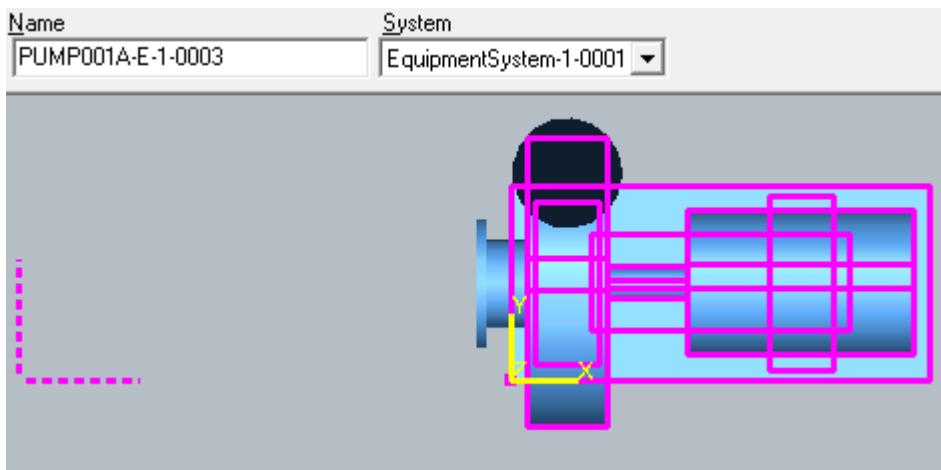
- Click in the graphic view to place the object at the pin-pointed location.

*The software places the object at the pin-pointed location.*



- Click to confirm the object placement.

The object is placed at the pin-pointed location.



## Place objects using spherical coordinates

The following procedure shows how the **Spherical Coordinates** option is used with the **Tools > PinPoint** command. For information on using rectangular coordinates or cylindrical coordinates, see *Place Objects Using Rectangular Coordinates* (on page 391) and *Place Objects Using Cylindrical Coordinates* (on page 395).

1. Select a task that allows you to place objects.
2. Click any **Place <object name>** command.
3. Select an object, and then specify the necessary properties.

*The software displays the computed graphics of the selected object.*

4. On the Common toolbar, click **PinPoint** to activate the PinPoint ribbon bar.

**TIP** Click **Display On/Off** to turn the PinPoint display on and off. You can also press F9 to toggle the PinPoint display on and off.

5. In the **Coordinate System** box, select a coordinate system in the list as the reference point.
  - **Global** - Global coordinate system is the default option. You cannot modify a global coordinate system.
  - **Select Graphically** - Allows you to specify a coordinate system graphically in the active window. Follow the instructions that appear in the status bar.
  - **More** - Displays the **Select Coordinate System** dialog box. Select a coordinate system from the Workspace or Database.



6. After you select an active coordinate system, click **Set Target to Origin** (plant) or (ship).

**NOTE** The software considers the targeted position as the new origin from which the distance will be measured. The target position does not change when you change the active coordinate system.

- Click **Spherical Coordinates** .

*The spherical value settings display on the right side of the ribbon.*

- Set the **Distance** value, and then click **Lock/Unlock Absolute Distance**  to lock the value. Absolute distance is the distance between the target and the pointer location.

**TIP** The shortcut key to lock/unlock this value is F6.



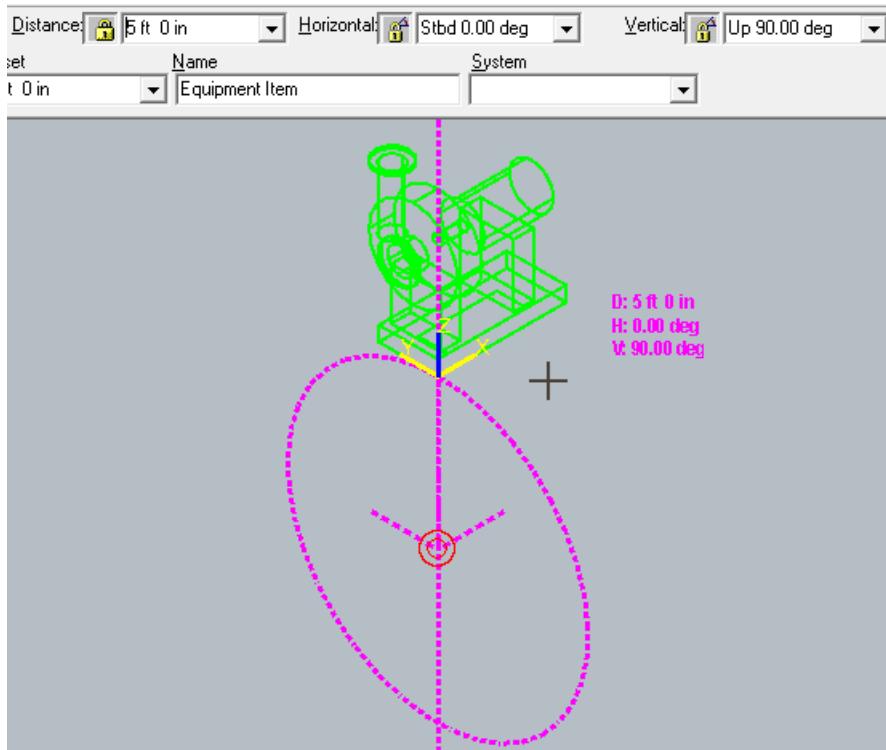
**IMPORTANT** When you lock the **Distance** value, the software automatically locks the **Vertical** angle with a default value. You cannot unlock an angle while the absolute distance is locked and no other angle is locked.

- Set the **Horizontal** angle, and then click **Lock/Unlock Absolute Distance**  to lock the value. This angle is in the horizontal plane and is measured clockwise from the **N**-axis (plant) or **Y**-axis (ship).

**TIP** The shortcut key to lock/unlock this value is F7.

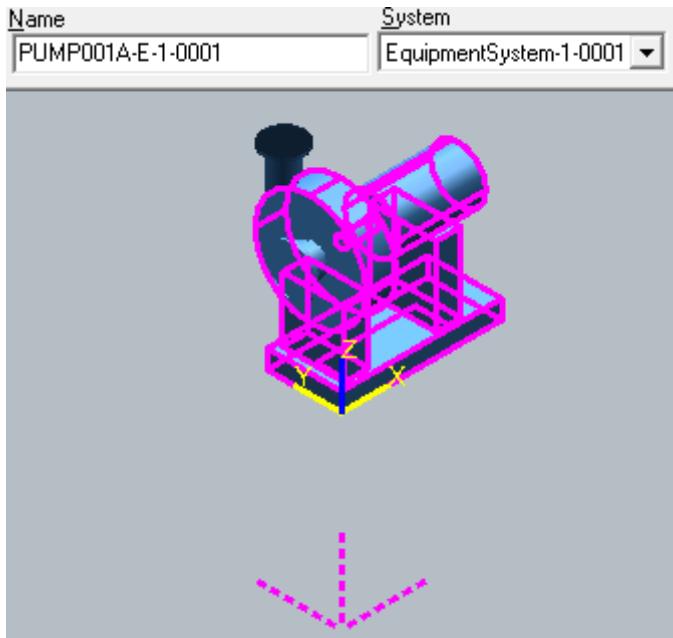
- If necessary, set the **Vertical** angle. Click **Lock/Unlock Absolute Distance**  to unlock the value, and then lock after specifying a new value. This angle is measured counter-clockwise from horizontal plane.

**TIP** The shortcut key to lock/unlock this value is F8.



- Click in the graphic view to place the object at the pin-pointed location.

*The software places the object at the pin-pointed location.*



#### **NOTE**

- The **PinPoint** command uses the highlight and selected element colors. You can set these colors on the **Tools > Options** dialog box. For more information, see *Change a Default Color* (on page 505).

## Place objects using cylindrical coordinates

The following procedure shows how the **Cylindrical Coordinates** option is used with the **Tools > PinPoint** command. For information on using rectangular coordinates or spherical coordinates, see *Place Objects Using Rectangular Coordinates* (on page 391) and *Place Objects Using Spherical Coordinates* (on page 393).

- Select a task that allows you to place objects.
- Click any **Place <object name>** command.
- Select an object, and then specify the necessary properties.

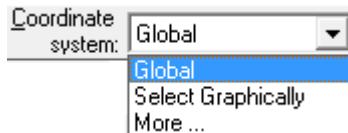
*The software displays the computed graphics of the selected object.*

- On the Common toolbar, click **PinPoint** to activate the PinPoint ribbon bar.

**TIP** Click **Display On/Off** to turn the **PinPoint** display on and off. You can also press F9 to toggle the PinPoint display on and off.

- In the **Coordinate System** box, select a coordinate system in the list as the reference point.
  - Global** - Global coordinate system is the default option. You cannot modify a global coordinate system.

- **Select Graphically** - Allows you to specify a coordinate system graphically in the active window. Follow the instructions that appear in the status bar.
- **More** - Displays the **Select Coordinate System** dialog box. Select a coordinate system from the Workspace or Database.



6. After you select an active coordinate system, click **Set Target to Origin** (plant) or (ship).

**NOTE** The software considers the targeted position as the new origin from which the distance will be measured. The target position does not change when you change the active coordinate system.

7. Click **Cylindrical Coordinates** .

*The cylindrical value settings display on the right side of the ribbon.*

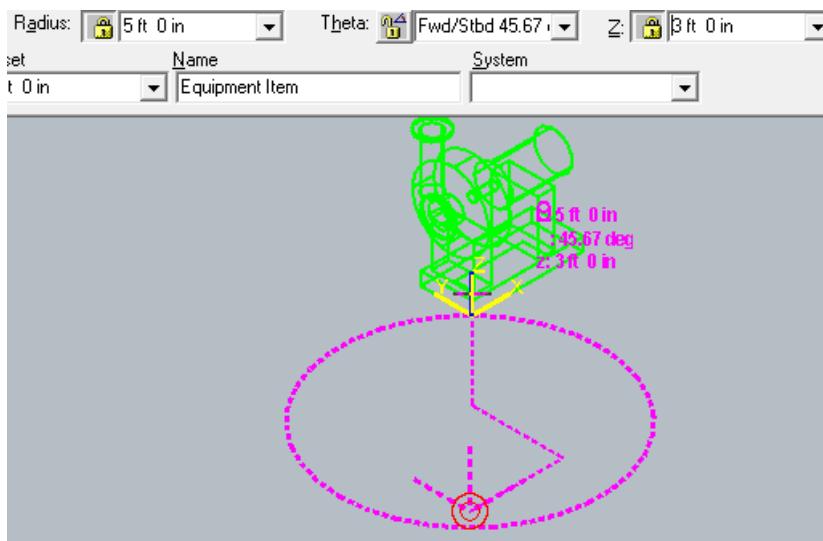
8. Set the **Radius** value for the cylinder, and then click **Lock/Unlock Absolute Distance** to lock the value.

**TIP** The shortcut key to lock/unlock this value is F6.



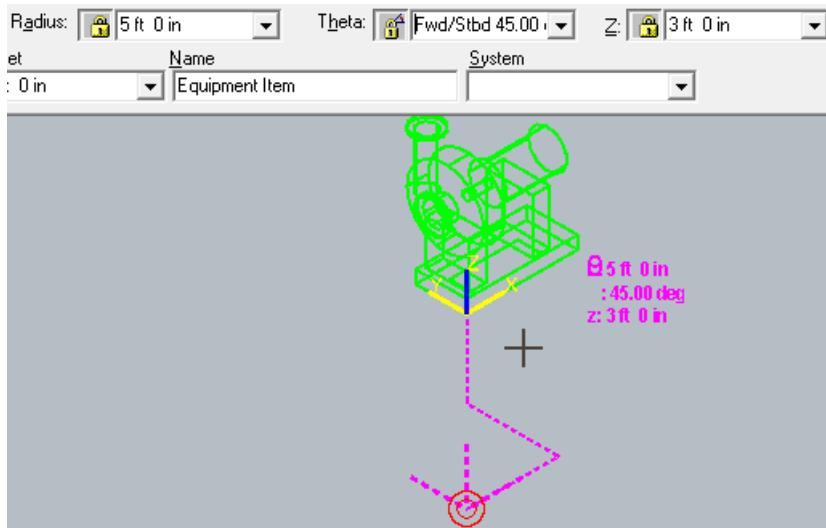
9. If necessary, set the **Z** value. Click **Lock/Unlock Absolute Distance** to unlock the value, and then lock after specifying a new value. This is the height of the cylinder.

**TIP** The shortcut key to lock/unlock this value is F8.



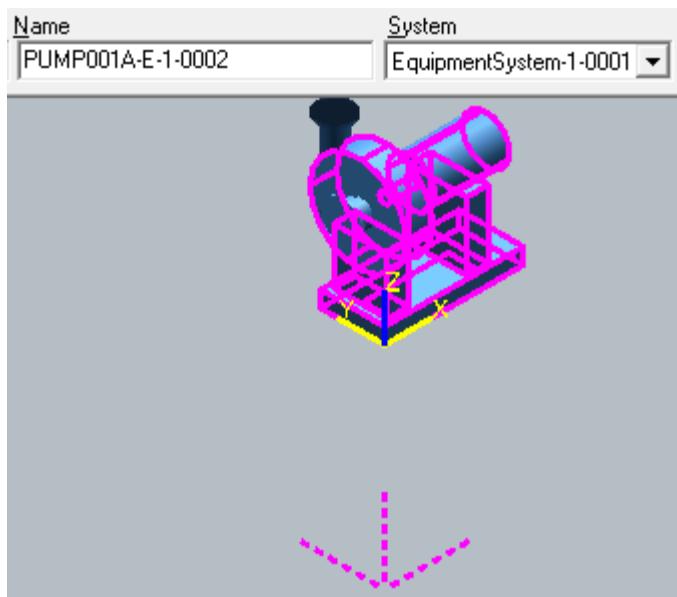
10. Set the **Theta** value, and then click **Lock/Unlock Absolute Distance** to lock the value. This angle is in the horizontal plane and is measured clockwise from the **N**-axis (plant) or **Y**-axis (ship).

**TIP** The shortcut key to lock/unlock this value is F7.



11. Click in the graphic view to place the object at the pin-pointed location.

*The software places the object at the pin-pointed location.*



#### **NOTE**

- The **PinPoint** command uses the highlight and selected element colors. You can set these colors on the **Tools > Options** dialog box. For more information, see *Change a Default Color* (on page 505).

## SmartSketch Options

 Displays a floating toolbar of SmartSketch options. You can click the options to turn them on and off as you make selections in the graphic view for other commands.

### Intersection

Displays  when you move the pointer over points where two or more objects overlap.

### Key point

Displays  when you move the pointer over the end of an element to which you can attach other elements.

### Parallel

Displays  when you place an object parallel to another object in your workspace. When this indicator appears, the software highlights the parallel objects. For example, if you add a section of pipe that runs parallel to another piece of pipe anywhere in your workspace, this indicator appears, and both objects are highlighted.

### Perpendicular

Displays  when you move the pointer so that a perpendicular relationship between two objects is recognized. For instance, when you connect two pipes at a 90 degree angle, this indicator appears.

### Center point

Displays  when you move the pointer over the center of a circle or arc.

### Point on curve

Displays  when you move the pointer over any connection point on an object, such as a nozzle on a piece of equipment.

### Reference axis aligned

Displays  when you move the pointer so that the object that you are placing is aligned with either the E, N, EL-axis (X, Y, Z-axis) of the active coordinate system. For example, if you are routing a pipe that moves parallel to the E-axis (X-axis), this indicator appears.

### Nozzle or other port point

Displays  when you move the pointer over an equipment nozzle or other port. Press F2 to toggle this option on and off.

### Point on surface

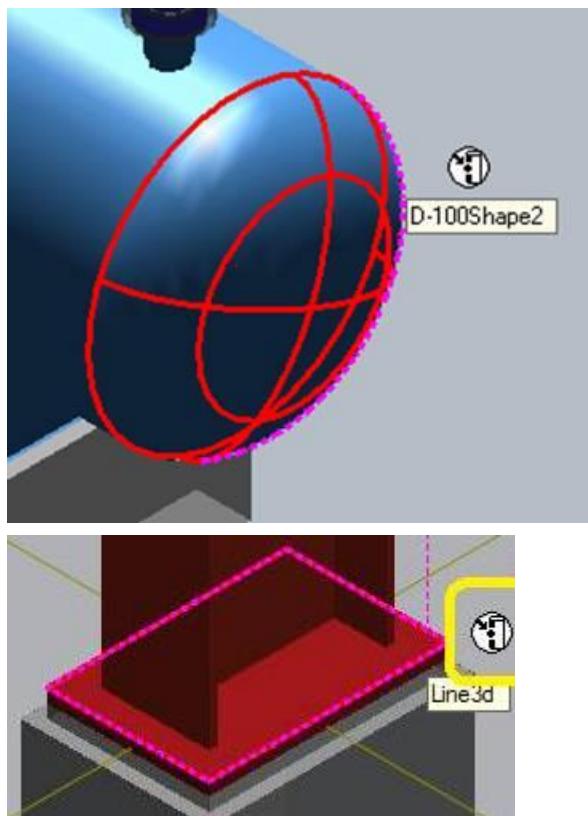
Displays  when you move the pointer over any location point on a surface object, such as a slab. Press F3 to toggle the option on and off.

### Edges on solids

Displays  when you move the pointer over the edge of a solid object.

### Silhouette edges

Displays  when you move the pointer over the silhouette edges of surfaces. The silhouette edges are the outside edges of the surface with respect to your view.



### Divisor point

Displays  when you move the pointer to the points where a line divides equally for the number of divisions that you set. A drop down list lets you choose from 2 to 7 divisions for the line. For example, if you select 4 for the number of divisions, you get a divisor point at  $\frac{1}{4}$ ,  $\frac{1}{2}$ , and  $\frac{3}{4}$  of the length.

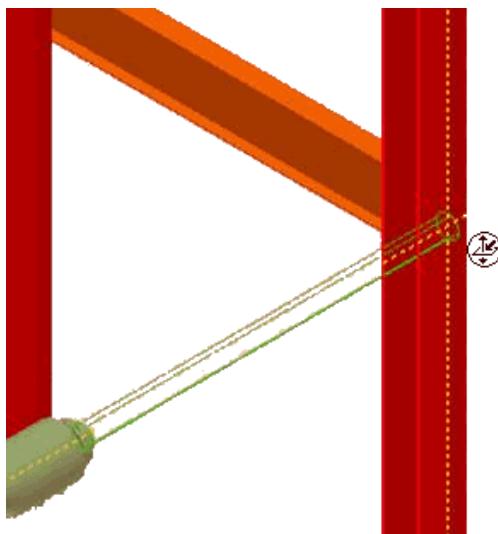
### Offset

Displays  when you move the pointer to a location that is the specified offset from a selected element or line. **Offset** also displays **Offset from surface**.

**★IMPORTANT** You must define a projection plane to use **Offset**.

**Offset from surface** - Displays  when you point to the location of a line that is offset from the intersection of your selected projection plane with a surface that is in the SmartSketch locate list. For example, if you are locating the end of a pipe, the indicator appears along the line that is offset from the intersection of the projection plane with the web

plane.



**TIP** The offset line is often easiest to locate if your view direction is perpendicular to the projection plane.



#### Locate only from list

Specifies that the software locates objects on the SmartSketch list defined when you use **Add to SmartSketch List** . For more information, see *Add to SmartSketch List* (on page 400).

## Add to SmartSketch List



Specifies SmartSketch 3D options for locating precision points of design interest relative to one or more geometric objects in the model.

When you are working in the software, you can use SmartSketch 3D to help locate points in the model. Four types of SmartSketch points exist:

- Key point
- Point on geometry
- Intersection point
- Linear relationship point

You can control the identification of SmartSketch points and relationship indicators using the **SmartSketch 3D** tab on the **Tools > Options** dialog box.

Other features of SmartSketch 3D include the ability to force all points to a projection plane, shown with a translucent plane in the graphic view. You can also use SmartSketch 3D along with **PinPoint**, the precision coordinate feedback tool. To set a constraint lock, you can use the shortcut keys, which are CTRL+L. Press and hold X to disable SmartSketch 3D.

SmartSketch 3D has two different behaviors. The first behavior, locate on the display list, is done in a parent-child manner on the geometry of objects in the model. This behavior is limits your selection to parent objects that you can actually see in the graphic view. Meaning that the location of ports is not possible because you cannot see a port, a child object, in the graphic

view. The second behavior, locate on the SmartSketch list, is done in a child-parent manner. This behavior means that surfaces, ports, and so forth are available for selection.

### Add to SmartSketch List Ribbon

Sets options for the locate list in the software.

#### SmartSketch Options

Displays the **SmartSketch Properties** dialog box, which is the same as the **SmartSketch** tab of the **Options** dialog box.

#### Select

Selects objects in the model. You can also click the other buttons on this ribbon to set SmartSketch options.

#### Clears the List

Removes all objects from the locate list.

#### Locate on List Only

Specifies that the software locates objects on the SmartSketch list from the bottom of the list up, which means that surfaces, ports, and so forth are all available for location.

#### List size

Specifies the number of objects on the list.

#### Dwell time

Specifies the time that you must pause the pointer over the object to add it to the list.

### SmartSketch Properties Dialog Box

Specifies the SmartSketch relationship indicators you want to use in your workspace. This dialog box appears when you click **SmartSketch Options**  on the **Add to SmartSketch List** ribbon.

#### Direction

##### Reference axis aligned

Displays  when you move the pointer so that the object that you are placing is aligned with either the E, N, EL-axis (X, Y, Z-axis) of the active coordinate system. For example, if you are routing a pipe that moves parallel to the E-axis (X-axis), this indicator appears.

#### Point

##### Key point

Displays  when you move the pointer over the end of an element to which you can attach other elements.

##### Nozzle or other port point

Displays  when you move the pointer over an equipment nozzle or other port. Press F2 to toggle this option on and off.

**Center point**

Displays  when you move the pointer over the center of a circle or arc.

**Point on curve**

Displays  when you move the pointer over any connection point on an object, such as a nozzle on a piece of equipment.

**Intersection**

Displays  when you move the pointer over points where two or more objects overlap.

**Perpendicular**

Displays  when you move the pointer so that a perpendicular relationship between two objects is recognized. For instance, when you connect two pipes at a 90 degree angle, this indicator appears.

**Parallel**

Displays  when you place an object parallel to another object in your workspace. When this indicator appears, the software highlights the parallel objects. For example, if you add a section of pipe that runs parallel to another piece of pipe anywhere in your workspace, this indicator appears, and both objects are highlighted.

**Divisor point**

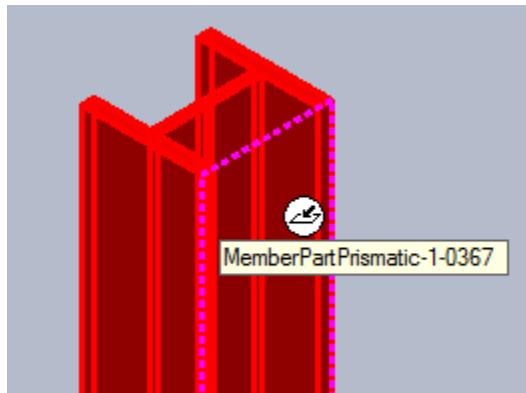
Displays  when you move the pointer to the points where a line divides equally for the number of divisions that you set. A drop down list lets you choose from 2 to 7 divisions for the line. For example, if you select 4 for the number of divisions, you get a divisor point at  $\frac{1}{4}$ ,  $\frac{1}{2}$ , and  $\frac{3}{4}$  of the length.

**Surface****Point on surface**

Displays  when you move the pointer over any location point on a surface object, such as a slab. Press F3 to toggle the option on and off.

**Virtual Box**

Displays  when you move the pointer to a bounding plane surrounding a graphical object. These bounding planes work only in conjunction with **Point on curve** and **Offset**.

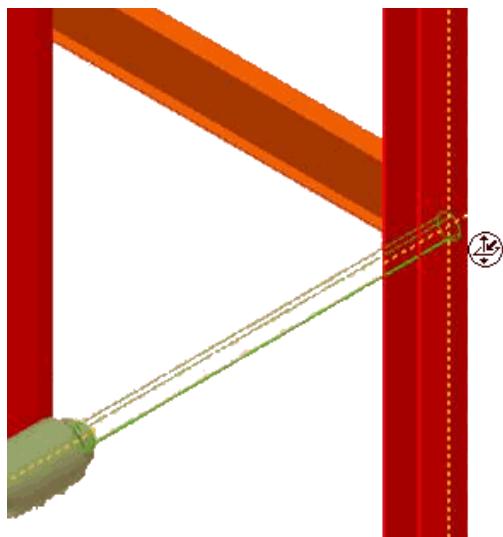


### Offset

Displays  when you move the pointer to a location that is the specified offset from a selected element or line. **Offset** also displays **Offset from surface**.

**★IMPORTANT** You must define a projection plane to use **Offset**.

**Offset from surface** - Displays  when you point to the location of a line that is offset from the intersection of your selected projection plane with a surface that is in the SmartSketch locate list. For example, if you are locating the end of a pipe, the indicator appears along the line that is offset from the intersection of the projection plane with the web plane.



**◆ TIP** The offset line is often easiest to locate if your view direction is perpendicular to the projection plane.

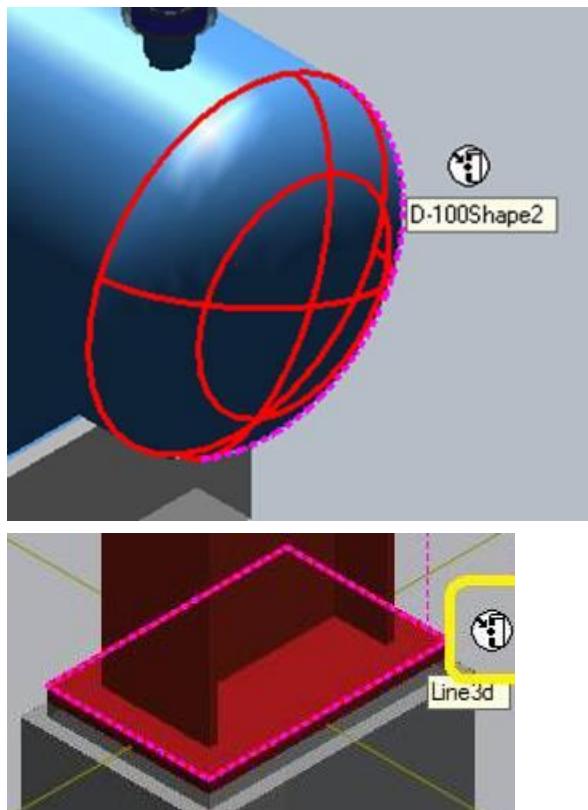
## Object

### Edges on solids

Displays  when you move the pointer over the edge of a solid object.

### Silhouette edges

Displays  when you move the pointer over the silhouette edges of surfaces. The silhouette edges are the outside edges of the surface with respect to your view.



## SmartSketch 3D List

### Locate only from list

Specifies that the software locates objects on the SmartSketch list defined when you use **Add to SmartSketch List** . For more information, see *Add to SmartSketch List* (on page 400).

### Dwell time for stack

Specifies the number of seconds that should lapse as you pause the pointer over an object in the graphic view before that object is added to the stack.

### Size

Specifies how many objects are added to the stack before the software begins removing

previously added objects. The value in this box must be an integer greater than 1.

#### NOTES

- Many of the **Add to SmartSketch List** controls also are available on the **SmartSketch** tab of the **Options** dialog box.
- You can press F3 to toggle the relationship indicator for locating surfaces on and off.
- Press and hold X to temporarily disable SmartSketch.
- The shortcut keys to turn on SmartSketch select mode are CTRL+D.
- To clear the SmartSketch list, press CTRL + SHIFT + D.
- The shortcut keys to set a lock constraint in SmartSketch are CTRL+L.

## Add objects to the SmartSketch list

1. Click **Tools > Add to SmartSketch List** .
2. Click **SmartSketch Properties**  on the ribbon to change any of the relationship indicator selections.
3. Click **Clears the List**  to remove all objects from the locate list.
4. Click **Locate on List Only**  to specify that the software locates objects on the list from the bottom of the list up.
5. Select a number in the **List size** box to change the maximum number of objects on the locate list.
6. Type a number in the **Dwell time** box to specify the time in seconds that you pause over an object to add it to the locate list.
7. Click **Select**  to choose objects in the graphic view you want to add to the locate list.
8. Click **Finish** to complete the selection and close the command.

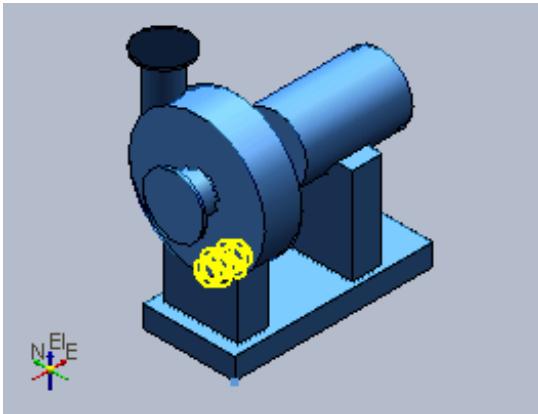
#### NOTES

- Many of the **Add to SmartSketch List** controls also are available on the **SmartSketch** tab of the **Options** dialog box.
- Press CTRL+D to add the selected object to the SmartSketch List.
- Press CTRL+L to lock the constraint in SmartSketch.

## Get Point

 Locates the centroid of planar faces, cylinders, curves, spheres, boxes, circles, and lines and places a sphere that provides visual feedback. The **Tools > Get Point** command prompts you to select a surface, and then it generates the point that can be used as a SmartSketch glyph.

 **NOTE** View manipulations are currently not possible with the **Get Point** command.



1. Click **Tools > Get Point**.

The status bar displays: *Select surface to get the center point.*

### NOTES

- If you click in the **Workspace Explorer**, the command continues to wait for a graphical point on a surface.
- If you click in an empty graphical space, the command continues to wait for a graphical point on a surface.
- If you move the pointer over various objects in the model, whole objects highlight.
- If you pause over the object where you want to select a specific surface, the **QuickPick** question mark appears. Click, and then the **QuickPick** bar appears. You can also activate **QuickPick** by pressing CTRL and clicking your mouse wheel.
- If you right-click, the command ends.
- If you click another major command, the command ends.

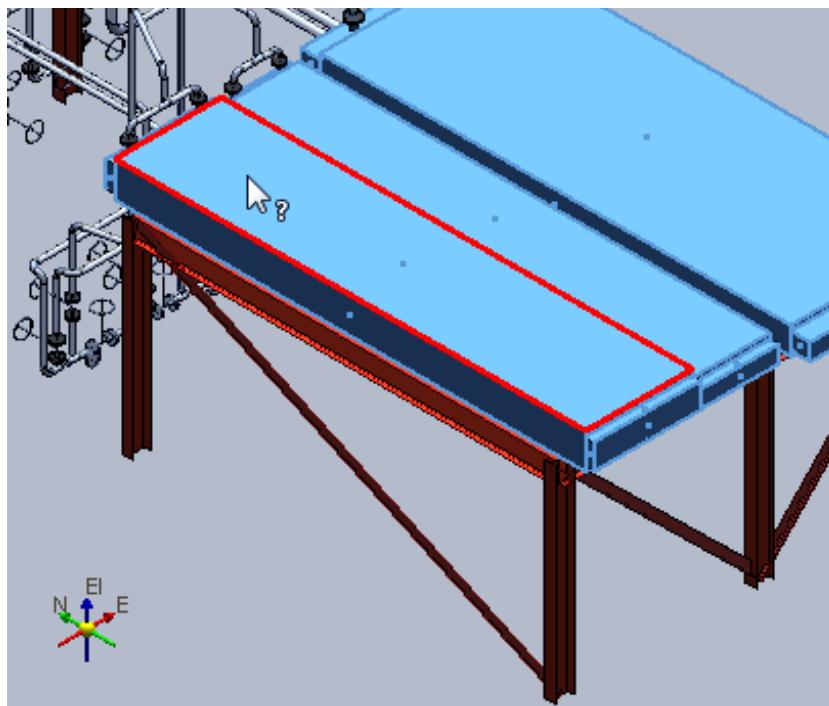
2. Click on a surface.

*The centroid of the surface gets stored as a SmartSketch glyph. The point can then be picked for any active command that uses the point glyph.* 

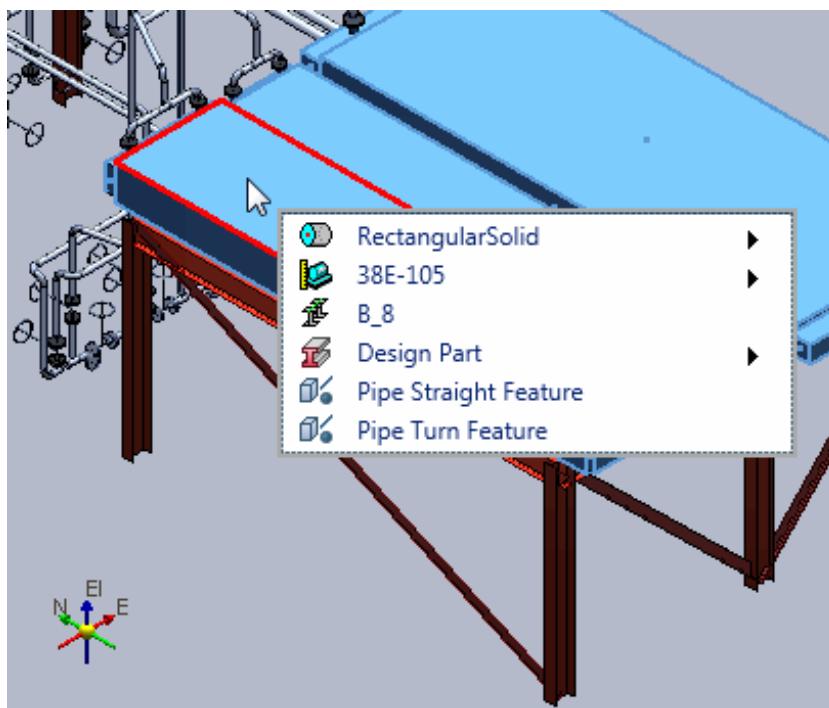
### Example Workflow

1. Click **Tools > Get Point** or use the button on the toolbar.  
*The **Get Point** command prompts you to select a surface.*
2. Pause over the object where you want to select a specific surface.

The **QuickPick** question mark appears.



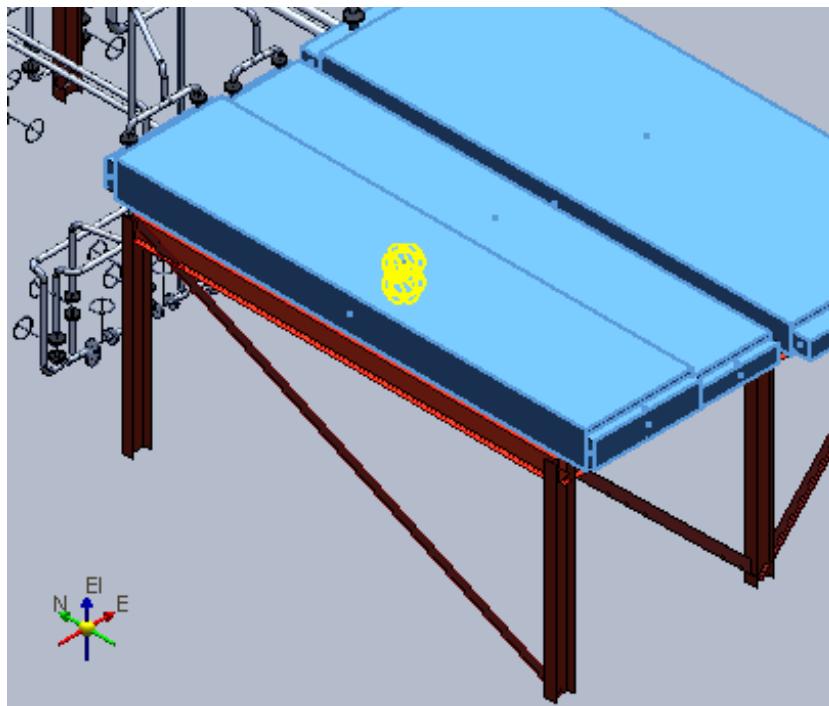
3. Click to display **QuickPick**.



**NOTE** You can also activate **QuickPick** by pressing CTRL and clicking your mouse wheel.

---

4. Select the surface where you want to specify a center point.

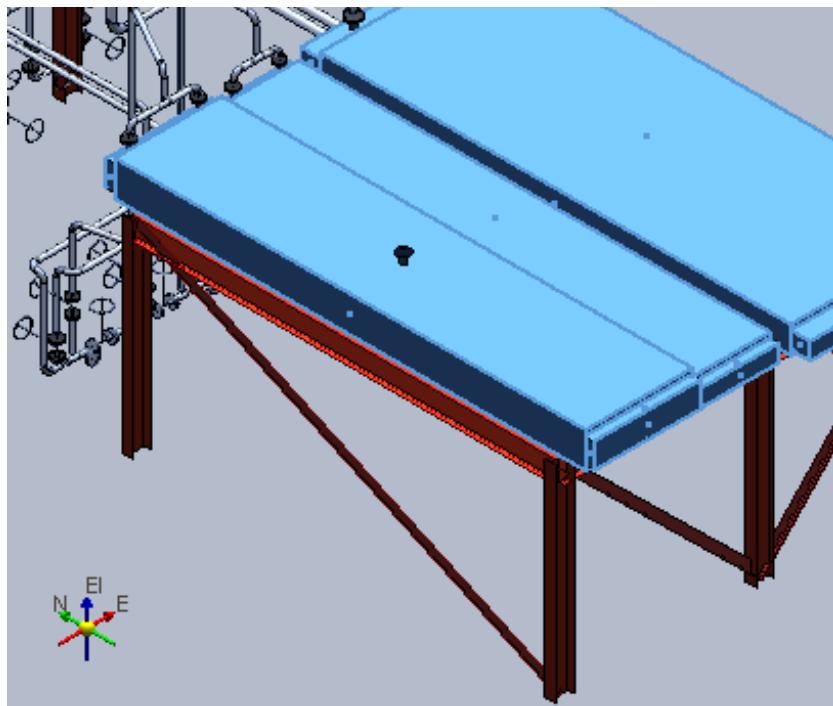


5. From the Equipment task, click **Place Nozzle** .
6. Specify the nozzle parent and properties.
7. On the **Location** tab, choose **Position by Point** and click **OK**.

*The **Place Nozzle** command prompts you to specify a point on the parent equipment.*

---

8. Use the SmartSketch glyph to select the center point to place the nozzle.



## Point Along

Use the **Tools > Point Along** command to help you place an object at a specific location along a path. A path can be along a pipe, duct, cableway, or the intersection line between two surfaces. You can measure:

- **Along object**, which is the distance along an element, such as along the surface of a pipe
- **Orthogonal**, which is the distance in the E-, N-, or EL-axis (X-, Y-, or Z-axis) direction from the reference point of the active coordinate system last defined by **PinPoint**.

Select a reference point from which to start measuring. As you move your pointer, the **Distance** box on the **Point Along** ribbon indicates the exact distance from the reference point to the location of your pointer. Key in a distance in the Distance box to lock your pointer that far from the reference point.

### Point Along Ribbon

Sets options for defining a point at a position along a path.

#### Reference

Identifies the path along which to measure. A path can be along a pipe, duct, cableway, seam, or the intersection line between two surfaces.

#### Reference Point

Identifies a point from which to measure. This point should be located on the reference element. You can use SmartSketch relationship indicators to assist you when setting the

reference point. To turn on the SmartSketch relationship indicators, use the **SmartSketch** tab on the **Tools > Options** dialog box.

#### Direction

Identifies the direction in which to measure. You can select **Along object**, which measures along a selected element, or you can select the E, N, EL or X, Y, Z-direction to measure orthogonally.

#### Step

Specifies a step distance from a reference point. The step distance is the incremental distance at which the software finds points. For example, if you want to insert valves at five-foot increments along a pipe, you can use this feature. This value must be a positive number. This option is not available if you type a value in the **Distance** box.

#### Distance

Specifies the distance that you want to measure from the reference point in the specified direction. Typing a value in this box is optional. If you type a value, it must be greater than zero. If you do not type a value, the distance from the **Reference Point** to your pointer displays.

## Place objects along another object

1. Click **Tools > Point Along** .
2. Start the command to place the new object, for example, **Place Tap**, **Insert Component**, or **Place Member**.
3. Click **Reference**  on the **Point Along** ribbon.
4. Select the object along which you want to place the new object. This reference object can be a pipe or a curve, or you can select an E-, N-, or EL-axis (X-, Y-, or Z-axis).
5. Select a point on the object from which to measure.
6. In the **Direction** list, select the direction of offset measure. You can select:
  - **Along object** to display the distance along the object from the reference point.
  - The E-, N-, or EL-axis (X-, Y-, or Z-axis) options display a distance or point in orthogonal directions using the active coordinate system defined for the workspace. You can define the active coordinate system using the **PinPoint**  or **Measure**  commands.
7. Move the pointer along the object to view the distance from the reference point. The distance appears both in the **Distance** box and in the active view.
8. Click in the view to define the location of the new object.

**NOTE** If you want to select a second point that is not along the reference object, you must click **Reference**  on the **Point Along** ribbon.

## Measure

 Measures distances and angles between objects in the model, including edges, faces, and key points.

With the **Tools > Measure** command, you can:

- Measure the actual 3D linear distance between two points.
- Measure the delta E- (X), N- (Y), and EL- (Z) distance using the last active coordinate system defined in the **PinPoint**  or **Measure** commands.
- Measure distance along an object, like the **Point Along** command, or the entire length of an object.
- Measure minimum distance between two objects, using the outside surface and not just the axis.
- Measure the minimum distance between two objects as projected to a selected plane.
- Measure and display hole radius and diameter as well as measure and display fillet radius.
- Measure the actual angle defined by three points.
- Measure angle between lines, using cylinder axes or nozzle axes as reference lines.
- Find SmartSketch points when the software prompts you to locate a start or end point to measure.
- Copy measurement values from the ribbon. The **Measure** command also sums repeated measurements and displays the cumulative results on the ribbon.

When you move the pointer over a key point, the distance between the current location of the pointer and the last point that you clicked displays next to the pointer in text and on the ribbon along with the delta values. The delta values are the distances, as measured along the E- (X), N- (Y), and EL- (Z) axes.

You can change the displayed units of measure for distance or angle by using the **Tools > Options** command.

 **IMPORTANT** You can use the **Measure** command to set the active coordinate system, which is a temporary coordinate system with a new origin and axis directions different from those of the global coordinate system. The active coordinate system affects certain calculations, such as weight and CG.

### Measure Ribbon

Sets options for measuring distances and angles by three-dimensional representation of the E-, N-, and EL-axes (X-, Y-, and Z-axes).

#### Coordinate System Properties

Shows properties of the active coordinate system.

#### Coordinate system

Assigns the coordinate system to use to define the axis directions.

#### Define Coordinate System by 3 Points

Defines a temporary coordinate system by three points. Point 1 defines the origin of the

coordinate system. Point 2 defines the end of the local E-axis (X-axis). Point 3 defines the end of the local N-axis (Y-axis).



### **Measure Distance Between 2 Points**

Measures the linear distance between two key points. A key point is any point that you can highlight with the SmartSketch relationship indicators.



### **Measure Minimum Distance**

Measures the shortest distance between two objects.

**NOTE** The software does not use the SmartSketch list when measuring minimum distance. The SmartSketch list is used, however, when measuring distance.



### **Measure Distance Along Element**

Measures from a reference point on an element to the last point clicked on the element, or along the entire element by pressing A on the keyboard. This mode is similar to the **Point Along** command.



### **Measure Radius and Diameter**

Measures the diameter or radius of a hole or fillet.



### **Measure Angle Between 3 Points**

Measures the angular value between three key points or two surfaces.



### **Measure Angle Between Objects**

Measures the angle between two objects in the model.

## **Plane**

Measures the minimum distance between two objects as projected to a selected plane. The following options are available:

- **No Plane** - Measures the minimum distance between the two objects.
- **Plan Plane** - Calculates the apparent minimum distance between the two selected objects. The software calculates the minimum distance along the east and north coordinates and displays it on the ribbon bar. The minimum distances also displays in the graphic view using the annotation texts at the middle point of the solid yellow lines.
- **Elevation Plane - East West** - Calculates the minimum distance along the north and elevation coordinates and displays it on the ribbon bar. The distance also displays in the graphic view using the annotation texts at the middle point of the solid yellow lines.
- **Elevation Plane - North South** - Calculates the minimum distance along the east and elevation coordinates and displays it on the ribbon bar. The distance also displays in the graphic view using the annotation texts at the middle point of the solid yellow lines.



### **Clear**

Resets the **Cumulative** box to zero.

### Cumulative

Sums repeated measurements until you clear this box or switch between angle and distance modes.

The remaining controls on the ribbon (defined below) depend on your selection of measuring distance, minimum distance, or angle.

### Measuring Distance

#### Distance

Displays the distance value. You can specify the units by clicking **Tools > Options** and selecting the **Units of Measure** tab. For more information, see *Change a displayed unit of measure* (on page 506).

#### △ East (X)

Displays the distance along the E-axis (X-axis).

#### △ North (Y)

Displays the distance along the N-axis (Y-axis).

#### △ Elevation (Z)

Displays the distance along the EL-axis (Z-axis).

### Measuring Minimum Distance

#### Minimum Distance

Displays the minimum distance value. You can specify the units by clicking **Tools > Options** and selecting the **Units of Measure** tab.

#### △ E (X)

Displays the distance along the E-axis (X-axis).

#### △ N (Y)

Displays the distance along the N-axis (Y-axis).

#### △ EL (Z)

Displays the distance along the EL-axis (Z-axis).

### Measuring Radius or Diameter

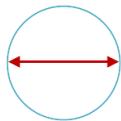
#### Radius

Displays the radius of the hole or fillet.



**Diameter**

Displays the diameter of the object.

**Measuring Angles****Angle**

Displays the angle measurement. You can specify the units by clicking **Tools > Options** and selecting the **Units of Measure** tab.

**Apparent angle**

Measures the angle of the lines projected onto the active view plane. If lines intersect (coplanar), then both the **Angle** and **Apparent angle** boxes display values. If lines do not intersect (are not coplanar), then only the **Apparent angle** box displays a value.

 **Copy Measurement**

Copies the measurement values from the ribbon.

**What do you want to do?**

- *Define a coordinate system by three points* (on page 414)
- *Measure an actual distance* (on page 415)
- *Measure minimum distance* (on page 416)
- *Measure the distance along an element* (on page 418)
- *Measure a radius or diameter* (on page 420)
- *Measure an angle* (on page 420)

**Define a coordinate system by three points**

1. Click **Tools > Measure**
2. On the ribbon, click **Define Coordinate System by 3 Points**
3. Click the first point to define the origin of the coordinate system.
4. Click the second point to define the end of the local E-axis (X-axis).
5. Click the third point to define the end of the local N-axis (Y-axis).
6. Click a measurement mode on the ribbon, and follow the status bar prompts to begin measuring.

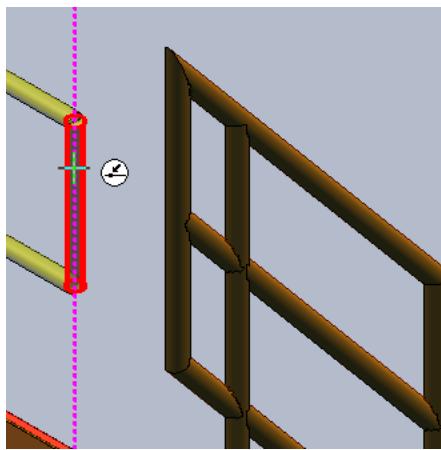
 **NOTES**

- You can change the units of measure by clicking **Tools > Options**. For more information, see *Change a displayed unit of measure* (on page 506).

- The measurement information only appears while the command is active. This command does not write any dimensions or information to the database.
- When you change the coordinate system with the **Measure** command, you also change it for the **PinPoint** command.

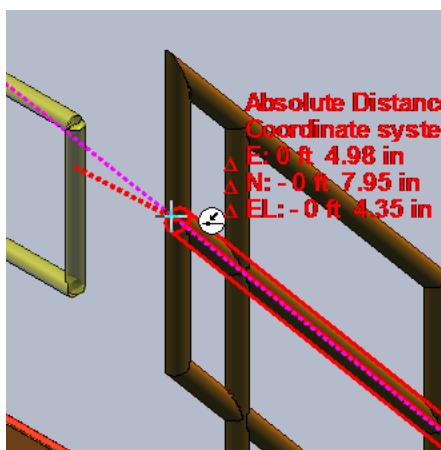
## Measure an actual distance

- Click **Tools > Measure**.
- On the measure ribbon, click **Measure Distance Between 2 Points**.
- Click the first point.



- Click the second point.

*The distance from the first point to the second point appears next to the pointer.*



**TIP** QuickPick is useful in selecting the two points for measurement.

- Continue clicking in the model for additional measurements, as needed.

*The software displays the total distance in the Cumulative box on the ribbon. Click Clear to reset the Cumulative value to zero.*

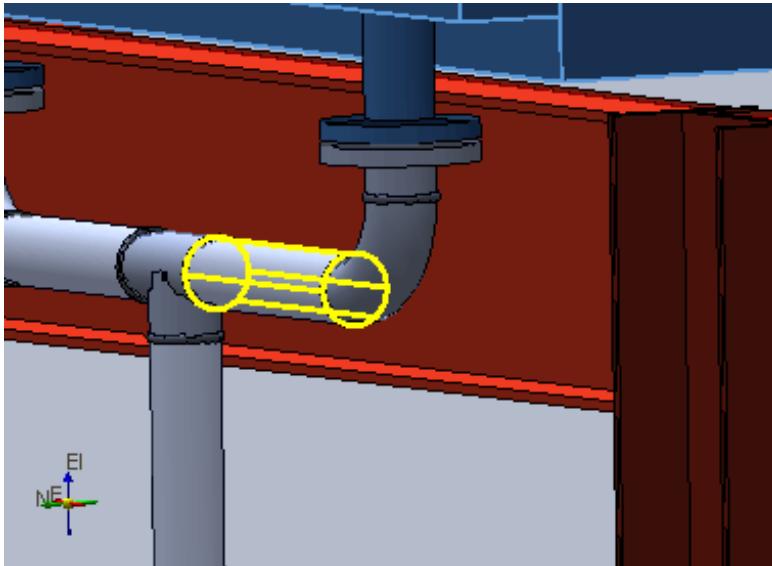
- Right-click to quit the **Measure** command.

**NOTE** You can change the display of the units of measure for the distance by clicking **Tools > Options**. For more information, see *Change a displayed unit of measure* (on page 506).

## Measure minimum distance

1. Click **Tools > Measure**.
2. On the measure ribbon, click **Measure Minimum Distance** 
3. Optionally, select the plane option to use from the **Plane** list.
4. Select the first object.

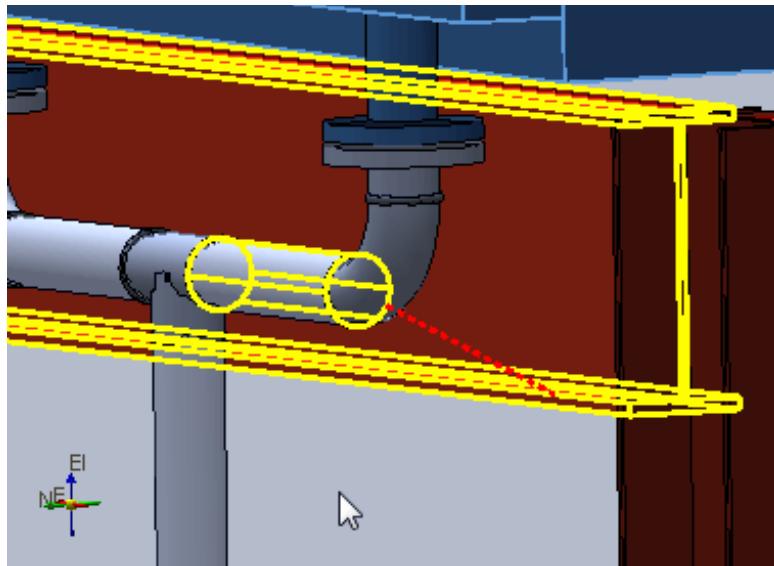
*The first object highlights, and the software prompts you to select the second object.*



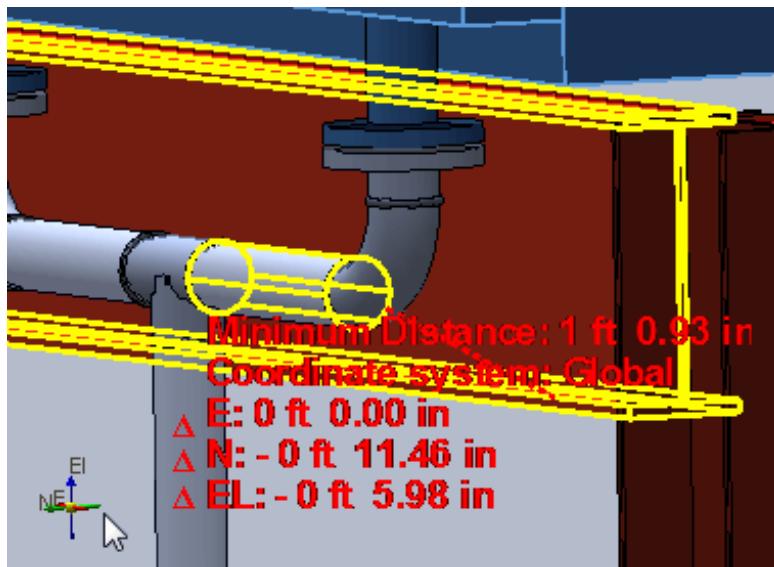
5. Select the second object.

*After you select the second object, the software draws a dotted line between the two points*

that are the nearest on the objects.



The following details appear on the screen: minimum distance, name of the active coordinate system, delta along the E-axis (X-axis), delta along the N-axis (Y-axis), and delta along the EL-axis (Z-axis).



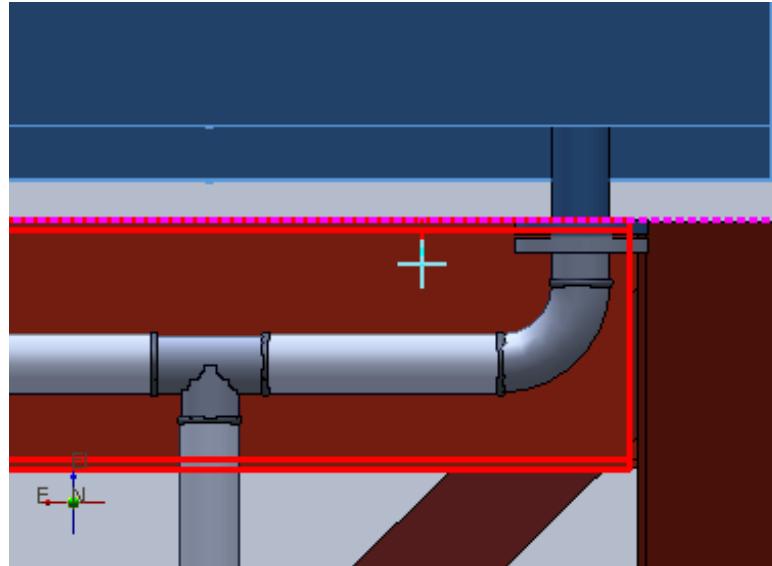
#### NOTES

- If you select a third object while in this mode, the software starts a new minimum distance measurement with the selected object as the first object selection.
- The software recognizes all objects that are displayed. For example, if insulation is displayed in the active graphic view, the software measures the minimum distance from the outside surface of the insulation.

## Measure the distance along an element

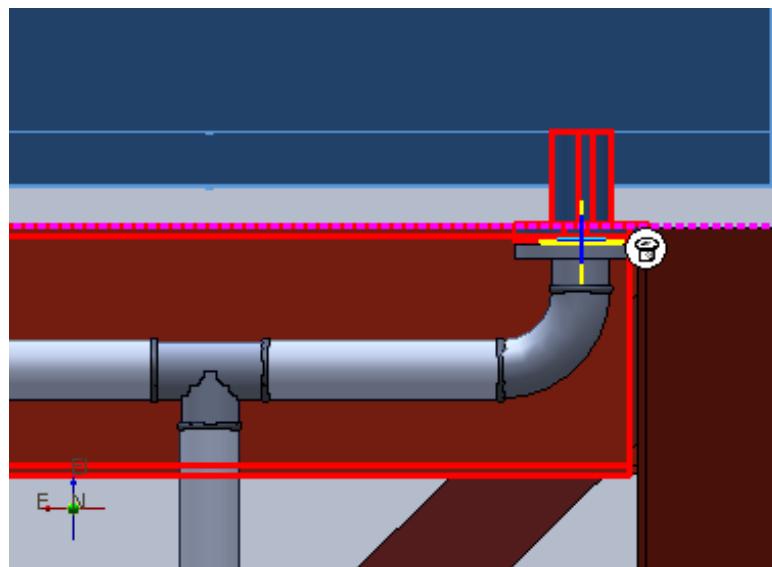
1. Click **Tools > Measure** .
2. On the measure ribbon, click **Measure Distance Along Element** .
3. Select the object or object edge to measure along. The edge you select can be straight or curved.

*The edge highlights, and the software prompts you to click a reference point along the edge from which to measure.*



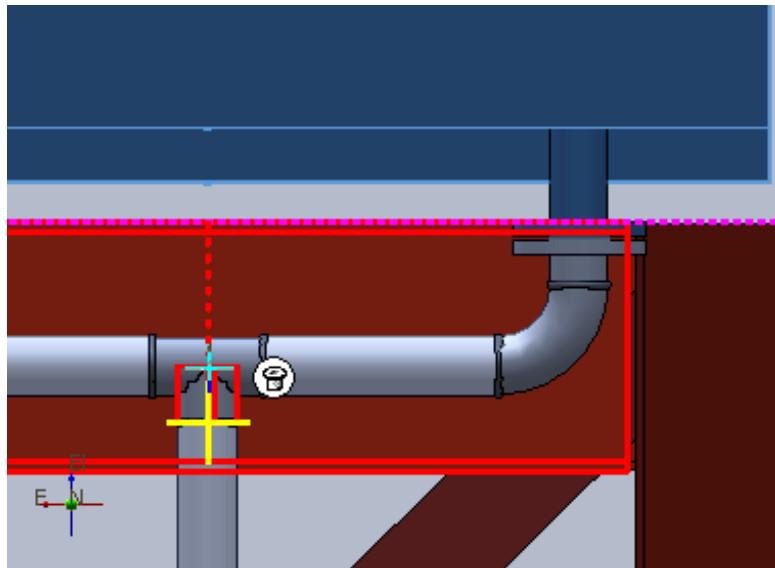
4. Click the reference point, or press A to measure the whole object length.

*The software prompts you to select a point along the edge to which to measure.*

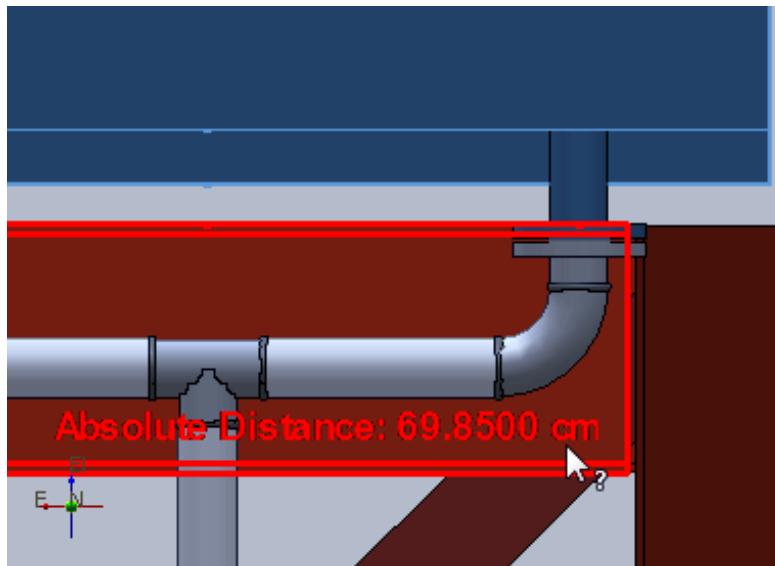


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5. Click the point to measure to.



The distance between the two points displays.



## Measure a radius or diameter

1. Click **Tools > Measure** .
2. On the measure ribbon, click  **Measure Radius and Diameter**.
3. Select a curved object or hole in the model.

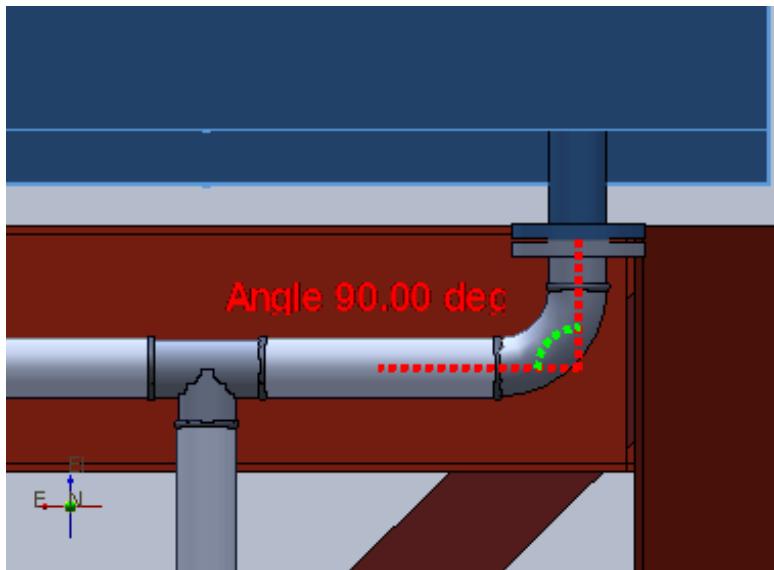
*The software displays the radius measurement on the ribbon if the curve is not closed. If the curve is closed, the software displays both the radius and diameter on the ribbon.*



## Measure an angle

1. Click **Tools > Measure** .
2. On the ribbon, click  **Measure Angle Between 3 Points**.
3. Place the three points in the model.

The angle between the points appears next to the pointer.



- Right-click to quit the **Measure** command.

#### **NOTE**

- When you measure an angle, the **Angle** and **Apparent angle** boxes appear on the ribbon. The **Apparent angle** box displays the angle of the lines projected onto the active view plane. If lines intersect (coplanar), then both the **Angle** and **Apparent angle** boxes display values. If lines do not intersect (are not coplanar), then only the **Apparent angle** box displays a value.

## Checking Interferences

Interference checking (IFC) ensures that parts do not occupy the same volumetric space and that each part meets the design criteria for clearance. A successful interference check ensures that there is sufficient space around the parts so that they can operate properly, be serviced properly, and be easily installed or removed when necessary. The IFC process can look at all model data, including data from a referenced 3D model, referenced MicroStation and 3D AutoCAD files, and Point Clouds from third-party software with valid connections.

There are two methods for interference checking:

- Server-based interference checking called Database Detect. For more information, see Server-Based Interference Checking (Database Detect).
- Interactive interference checking called Local Detect. For more information, see Local Detect.

The major differences between the two methods are:

Database Detect	Local Detect
Runs continuously (System Administrator choice)	Works only within the current session

A dedicated server takes care of the IFC process, minimizing impact on users and improving performance	Provides immediate graphical feedback (works immediately after commit.)
Creates persistent interferences that are stored in the Model database	Creates temporary interference markers in a user session, which are not stored in the Model database. After you refresh the workspace, the temporary markers are removed
Based on administrator settings (controlled by permission groups)	Based on individual user settings
Provides feedback on how much has been checked in the entire model	Checks only created and modified objects in a session
Interference markers associate and come into the workspace along with the object participating in the interference	Clears dynamic interferences after refreshing workspace
<p><b>NOTE</b> The <b>Smart 3D - External Data</b> option only checks Smart 3D objects against external objects.</p> <p><b>Smart 3D - External Data</b> only checks for interference between two R3D external objects.</p> <p>IFC finds interference between R3D and R3D objects that belong to different R3D projects that participates in IFC.</p> <p><b>Smart 3D - Point Cloud</b> option only checks objects against point clouds and Smart 3D.</p>	Finds interferences involving attached Reference 3D models (with option <b>Interference Detection</b> set to <b>Participate</b> ) and objects in inserted 3D files (MicroStation dgn or AutoCAD dwg) in the workspace without requiring a specific setting.
Includes a referenced point cloud when the <b>Smart 3D Point Cloud Compare</b> option is selected in the Project Management interference checking settings.	Receives the point cloud specification via the <b>File &gt; Define Workspace</b> workflow in <b>Smart 3D</b> when the <b>Smart 3D Point Cloud Compare</b> option is selected.

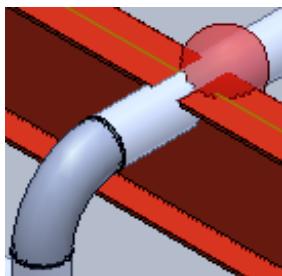
The Database interference checking objects, or markers, appear in the model until other objects are moved so the interferences no longer exist, or the aspects for the interference process are changed. It is not possible to delete an interference object in the same way you can delete other objects in the model. However, you can tailor the display to hide acceptable interferences.

Interference checking can be used with rules in the reference data. The delivered rules include post-processing rules and clearance rules. For more information about the delivered IFC rules, see *Interference Checking Reference Data* in the *Interference Checking Guide* available from the **Help > Printable Guides** command in the software.

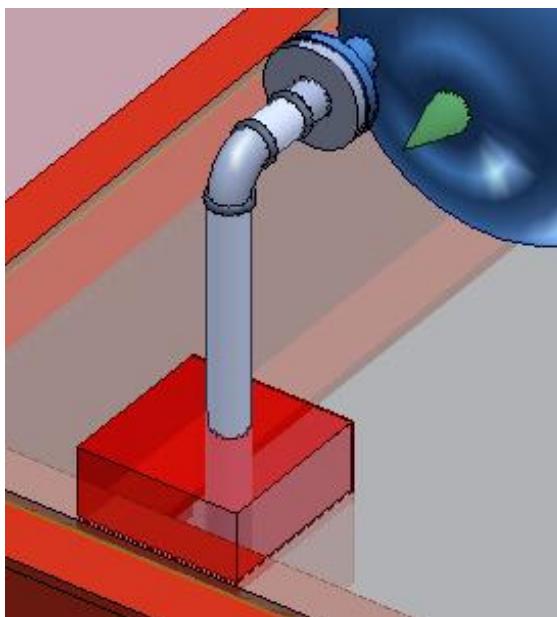
## How Interference Checking Results Appear

The Database Detect process marks any persistent interference with a spherical interference mark at the location of the interference. For example, the Database Detect service found an

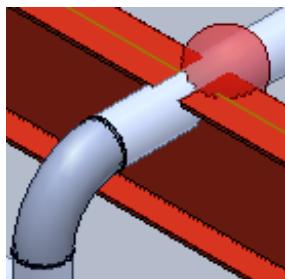
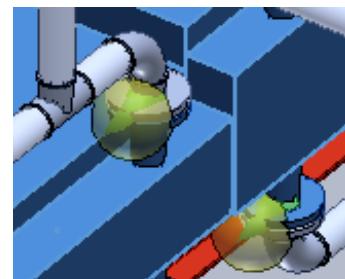
interference between this pipe and this beam, so it placed a spherical interference marker at that location.



The Local Detect process marks any interference it finds with a cube interference marker. For example, the software finds an interference and places a cube interference marker where there is an interference between a pipe and the floor.



For both processes, the color of the marker indicates the type of the interference: red for severe, green for clearance, and yellow for optional. You can modify the default interference marker colors with the **Format > Surface Style Rules** command. You can change the size of both the Database Detect and Local Detect interference markers using the **Marker size** option on the **Interference Server Setting** dialog box in Project Management task and the **Interference Checking Settings** dialog box in the Common task, respectively.

**Severe Interference****Clearance Interference****Optional Interference**

You can clear the acceptable interferences from your workspace by changing the required action on the *Interference List Dialog Box* (on page 443), and then editing the display properties on the *Interference Checking Settings Dialog Box* (on page 438).

In general, the software checks the parts involved in interfering objects to find and report the interferences. For example, if you have a pipe run that consists of a pipe, an elbow, and a pipe, each intersecting another pipe. The interfering pipe intersects the pipe run at each of the three positions. The software generates three interferences, and then displays them in the **Interference List** dialog box.

If an object has an interference with two other objects, these interferences are listed as two separate interferences in the **Interference List**. You can view all possible associated interferences (selected aspects) of an interference by right-clicking the interference row in the **List** view. This action opens the **Interference Settings** dialog box, and you can then click **Other Aspects** to see a list of all the aspects at the interfering location.

**NOTE** When an object is brought into the workspace, all of its associated interferences appear, even if they are not part of the filter used to define the workspace.

If an object has a very large range, or if it is located in a dense area of the model, it may take longer to process all of its clash interferences. If the number of parts that the object has to check for clash interferences is greater than 2000, the object is categorized as a delayed part. During the processing phase, these delayed parts are skipped, and then they are reprocessed. If the number of parts that the object has to check for clash interferences is greater than 20,000, the object is categorized as a bad part. The delayed and bad parts are listed in the S3D Error log file.

**NOTE** An object is also categorized as a bad part if its range or geometry information are unobtainable for the aspects configured for clash detection. The **Properties** dialog box for the clash object describes why the part is bad, and how to resolve any discrepancies. For example, you may have to update the object or process a To Do List item for the object.

The range of values that determine whether or not an object is a delayed part are defined by the **RangelIntersectionObjCountMin** and **RangelIntersectionObjCountMax** registry entries. The registry entries are located in the   
 `Intergraph\Applications\Environments\FoulCheck\Settings\Remote` folder. You can edit these values to fit your needs. However, editing these values may cause a significant lag in the interference checking process.

**NOTE** Review the delayed and bad parts for modeling issues and any errors that can result from the displayed object ranges for the aspects selected for interference checking.

## Role of the Administrator

An Administrator can limit the access to interference checking to the proper permission groups. An Administrator sets up the options for the background interference checking at the beginning of the project and is the only one permitted to change these options. This capability requires that an Administrator have read access to all objects in the database for the background interference checking to work properly. Users do not need to have access to all objects. For more information, see the *Smart 3D Interference Checking Guide* available from the **Help > Printable Guides** command in the software.

The server-based interference checking process can only be started from a client machine on which both the **Project Management** and the **Database Interference Detection Process** options are installed. The Administrator can run the detection process on more than one model simultaneously on the interference server. When an Administrator starts Database Detect, progress and statistical information is displayed on the **Status** tab of the dialog box.

**★ IMPORTANT** Only an Administrator can start the Interference Detection Service (IfcNtSvc) on the system and set up the Interference Detection process (IFCProcess).

## Interference Checking License Management

The interference checking process consumes one license to process five models. It releases a license for every five models that stop processing. For example, IFC consumes two licenses to process ten models, one license for processing Model1 through Model5, and then another for processing Model6 through Model10. Similarly, it releases a license after the sixth model stops processing, and then another after the remaining models stop processing.

### **★ IMPORTANT**

- The IFC service does not consume a license when it starts. It consumes a license only while processing the model.
- IFC consumes a license for every five models.
- IFC cannot process a new model if a new license is not available.
- You cannot set a number for processing models in the registry.

### See Also

*Check Interference Command* (on page 433)

*Checking Interferences Common Tasks* (on page 428)

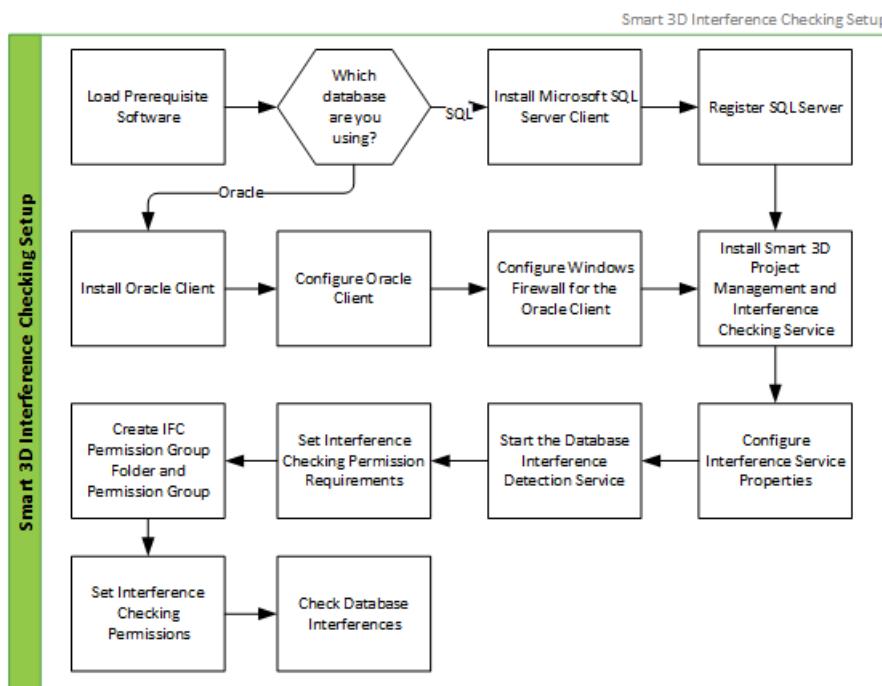
*Display the Interference Status* (on page 438)

*Set Interference Checking Parameters on a Workstation* (on page 435)

## Server-Based Interference Checking (Database Detect)

Unlike the traditional file-based method of manually defining groups of parts to check against each other, **Check Interference** is a separate software process that runs directly on the Model database. Although the interference detection process can be run on any computer with the **Database Interference Detection Service** installed, due to the intensive nature of the interference check computations, the recommendation is to have a computer dedicated as the interference server.

**NOTE** In order to monitor interferences, you must install the **Database Interference Detection Service** option on the same computer that the **Project Management** option is installed.



Database detection options are set in the Project Management task. You can also start and stop the interference database detection process in the Project Management task.

Interference detection requires disk space for the file cache that temporarily stores the interference data. Before starting the interference process, the interference server checks to see if enough space exists in the TMP location for the file cache. The server also checks to see if you have the proper permissions to write, read, and delete files in the TMP location. During the process, if the space becomes too low, the software stops IFC, and then displays an error message. These checks primarily apply to the server-based interference process. Although, they can apply to the local checking process if extremely low or no disk space is available for the temporary folder on the local computer.

**IMPORTANT** Configure automatic disk defragmentation in order to free space for the file cache.

After you start the process, use the **Status** tab on the **Interference Server Settings** dialog box to monitor the start time, progress of the interference checking, time when the last part was

modified, and the status of the checking. A box at the top of the dialog box identifies the model that you are checking.

The software automatically checks new or modified objects apart from existing objects. When you create or modify an object, the software checks for interference against all objects in the Model database. The interferences generated by this process are persistent; that is, the interferences are stored in the database like any other objects in the software. You can also modify these objects by changing the properties. Interferences are also assigned to a permission group; thereby the entire process is under the control and restrictions of an administrator.

You can interrupt the automatic interference checking process during a work session without forcing a recheck of all parts in the database when the process is brought back online. When you restart the interference check process, the software begins checking where it left off when the process went offline. However, if you change any of the options on the **Interference Server Settings** dialog box for Database Detect, all pre-existing interference checking processes are cleared from the database, and checking restarts from the beginning.

The server-based interference checking runs continuously. Therefore, you can perform an interference check at any time and view the interferences of interest that result from the background check by refreshing the workspace. After you have reviewed the interferences, you can remove an interference automatically from the database by editing the objects so that the interference no longer exists. You can then see the results of your edit by refreshing the workspace. Because certain types of interferences are allowable, you also have the capability to mark such interferences as acceptable.

Be aware that there is a four minute interval between the time you make your edits and the time that the database detect service rechecks the objects. After the database detect process reaches 100%, the software issues a query only every two minutes to locate newly modified objects. Therefore, it is possible that there is a six minute delay before a modified object is processed. We do not recommend changing the default four minute interval. However, if you are in **Project Management** with the **Interference Server Setting** dialog box open, press **CTRL+SHIFT+F12** to change the default four minute interval.

 **NOTE** You must run the Database Detect process before running an interference report. The report is not intended to run on local interferences.

## Interactive Interference Checking (Local Detect)

You can start and stop local interference checking from a user workstation. You can start the local interference checking by selecting the **Check Interference** command on the **Tools** menu. This action invokes the **Check Interference** ribbon, which provides all the tools required for setting up and running the local interference checking process.

When you run local interference checking, interferences are calculated on your workstation, not on the interference-checking server. Therefore, interactive and background interference checking processes can run simultaneously. Local interference detection is limited to checking objects that you create or edit while the Local Detect option is turned on. The status of the local interference check appears in the lower right corner of the application window.

Interactive interference checking provides real-time help through graphical feedback about potential interferences. You can see the interferences immediately after placing the object in the model. For example, when routing a pipe, the software checks interferences for that pipe after the commit to the database.

Because interactive interference checking occurs in real time, the interferences detected interactively are more current than those detected from background interference checking. You can view these background interferences from your workstation. If you have appropriate permissions, you can change the required action of the interferences.

Interactive interference checking only looks for interferences between objects in the active workspace. Hidden objects are not checked. Thus, what you see is what is checked for interferences. Interactive interference checking is not persistent. Therefore, if you close and open or refresh the session file, all the local interferences are removed. However, when you refresh the session, your local interferences become part of the Model database if server-based interference checking is running on the same model.

### Run Clash Detection Interactively on a Select Set

You can use the **S3DFoulCheckCmds.CForceLocalIFCCommand** custom command to process a defined workspace for interference. This command does the following:

- If there is a select set, processes all of the selected objects for clashes against other objects in the workspace, including those objects in the select set.
- If there is no select set, processes the entire workspace for clashes.
- Turns on the local interference detection to initialize the Local IFC engine.
- Honors your clash detection settings.

**NOTE** This custom command clears any existing local clashes in the workspace, but does not change the remote clashes created by the IFC remote engine.

## Checking Interferences Common Tasks

The following tasks are used frequently when you want to check interferences in your workspace.

### Installing and Configuring Database Interference Detection Service

To install and configure the Database Interference Detection Service, follow these procedures in order:

- Install Database Interference Detection Service (on page 429)*
- Configure Interference Service Properties (on page 430)*
- Start the Database Interference Detection Service (on page 430)*
- Create IFC Permission Group Folder and Permission Group (on page 431)*
- Set IFC Permissions (on page 431)*
- Check Database Interferences (on page 432)*

### Setting the Local Interference Checking Parameters

You can edit the local interference checking parameters to meet your specific requirements. For more information, see *Set Interference Checking Parameters on a Workstation (on page 435)*.

### Displaying Interferences

You can control the display of interferences as follows:

- Show all the interferences or only those related to selected objects.
- Hide all the interferences or only those related to selected objects.

- Fit the interferences detected by the software in a view.

For more information, see *Control Interference Display* (on page 435).

### List Interferences

You can display the list of detected interferences and edit the objects to correct the problem. For more information, see *List interferences* (on page 436).

### Change Required Action

You can change the required action for the interferences selected in the graphic or list view. For more information, see *Change Required Action* (on page 437).

## ***Install Database Interference Detection Service***

Prior to installing the Database Interference Detection Service on a computer, verify that all prerequisite software has been installed. If you have an older version of the Database Interference Detection Service installed on your computer, remove it before loading the new software.

You must have administrator privileges on the computer to install the software.

1. Open **Control Panel**.
2. Open **Programs and Features**.
3. Select **Intergraph Smart 3D** from the list of installed software's.
4. Click **Change**.
5. Select **Database Interference Detection Service**.
6. Optionally, select **64-bit Services** if you want to install the 64-bit version of the interference detection service also.

**★ IMPORTANT** If you are running Oracle, you must install the 64-bit Oracle client on the computer running 64-bit interference detection.

7. Click **Update**.

**NOTE** If you have not yet installed Smart 3D on the computer, see *Install Smart 3D Client Software* in the installation guide for detailed instructions.

### **See Also**

*Interactive Interference Checking (Local Detect)* (on page 427)

## Configure Interference Service Properties

1. Click **Start > All Programs (All Apps for Windows 10) > Intergraph Smart 3D > Database Tools** (Windows 7 only) > **Configure Interference Checking Service**.
2. In the **Configure Interference Service** dialog box, select your database type.
3. Select the site database server (Microsoft SQL Server) or the Oracle Service for the site database.
4. Select the site database on which the interference service is to run.
5. Click **OK**.

## Start the Database Interference Detection Service

Prior to starting the Database Interference Detection Service, you must configure its properties. For more information, see *Configure Interference Service Properties* (on page 430).

1. Log on with Administrative privileges to the computer on which the **Project Management** and **Database Interference Detection Service** options are installed.
2. Open the **Control Panel**, and then double-click **Administrative Tools**.
3. In the **Administrative Tools** window, double-click **Services**.
4. Right-click either the **Smart 3D Interference Detection Service** or the **Smart 3D Interference Detection Service 64-bit**, and then select **Properties** from the shortcut menu.

**★ IMPORTANT** The 64-bit Smart 3D Interference Detection Service does not process Point Clouds. Use Reference 3D if you are running 64-bit IFC, or you can switch to a 32-bit IFC server to process Point Clouds.

5. On the **Log On** tab, select the **This account** option, and then type the user name that has Administrative privileges.
- NOTE** This version of the software does not support the **Local System account** option.
6. In the **Password** and **Confirm password** boxes, type the password for the user account.
7. On the **Recovery** tab, set the **First failure**, **Second failure**, and **Subsequent failures** options to **Restart the Service**.
8. Set **Restart service after** to a minimum of 6 minutes.
9. On the **General** tab, verify that the **Startup type** is set to **Automatic**.
10. In the **Service status** section, click **Start**.
11. Click **OK**.

### NOTES

- The interference checking service does not consume a license when it starts. It consumes a license only while processing the model. For more information, see *Checking Interferences*.
- Errors that are encountered during startup of the Database Interference Detection service are logged to the Event Viewer Application Log with the source name **IFCNTSvc**. The service can automatically recover from these situations:
  - network interruptions
  - lost database connection

- the interference checking process runs out of memory
- the interference checking process or service is terminated for any reason
- Do not run the 32-bit and 64-bit interference detection services simultaneously on a computer. IFC must only run as a single instance for the entire model.

## Create IFC Permission Group Folder and Permission Group

1. Log on with administrative privileges to the computer where you have installed the **Project Management** and **Database Interference Detection Service** options.
2. In the Project Management tree view, navigate to the models icon.
3. Expand the models folder.
4. Right-click a model under the models folder, and select **New Permission Group Folder** on the shortcut menu.
5. Type **IFC Permission Group Folder** for the name of the new permission group folder.
6. Click **OK** to close the **New Permission Group Folder** dialog box.
7. In the tree view, navigate to the **IFC Permission Group Folder** icon.
8. Right-click the **IFC Permission Group Folder**, and select **New Permission Group** on the shortcut menu.
9. Type **IFC Permission Group** for the name of the new permission group.
10. Click **OK** to close the **New Permission Group** dialog box.

**NOTE** After the IFC permission group is created, you must assign the proper access permissions. For more information, see *Set IFC Permissions* (on page 431).

## Set IFC Permissions

1. Log on with administrative privileges to the computer on which the **Project Management** and **Database Interference Detection Service** options are installed.
2. In the Project Management tree, navigate to the **IFC Permission Group** icon.
3. Right-click the **IFC Permission Group** icon, and select **Permissions**.
4. On the **Access Permissions** dialog box, click **Add**.
5. In the **Add names** grid, double-click in the **User** cell, and type the domain and name of the user or group to add.

### ! TIPS

- You can also click **Add** and search for users using the **Select Users and Groups** dialog box. This is a common Windows dialog box. For information regarding the options in this dialog box, see your Windows documentation.
- To remove a user or group from the **Add names** grid, select the appropriate row, and then click **Remove**.

6. In the **Type of access** list, select the type of access you want to assign. The software automatically updates the associated row in the **Add names** grid.
7. Click **OK**.

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8. Click **OK** again to close the **Access Permissions** dialog box.

## **Check Database Interferences**

Before performing the following procedure, you must first manually configure the Smart 3D Interference Detection Service on the computer with the service installed.

1. In the Project Management tree, right-click the **Interference Server** icon  under the model for which you want to start Database Detect. Then select **Properties** on the shortcut menu.
2. In the **Interference Server Settings** dialog box, assign interference checking priorities to aspects.
 

**TIP** **Maintenance**, for example, is a typical aspect listed in the **Aspect** column. If a check of this aspect is important, you can indicate the priority as **Required**. If **Maintenance** is low priority or not important, you can indicate the priority as **Optional** or **Not Checked**.
3. Specify the interference comparison criteria:
  - **Required - Required** - Defines interferences classified as hard/hard. For example, one pipe physically intersects with another pipe. Severe interferences are shown in red.
  - **Required - Optional** - Defines interferences that are not as severe and are classified as hard/soft. For example, one pipe overlaps the optional aspect of the other object. Optional interferences are shown in yellow.
  - **Optional - Optional** - Defines interferences that are not severe and are classified as soft/soft. For example, the maintenance aspect of one piece of equipment overlaps the maintenance aspect of another. Optional interferences are shown in yellow.
  - **Smart 3D - External Data** - Considers objects outside the active model for interferences. For Local Detect, this option is enabled by default. For Database Detect, this box must be checked if you want attached Reference 3D models, inserted MicroStation and AutoCAD files to be considered. This option only checks objects against objects in external references and also checks for interferences between two external R3D objects.
  - **Smart 3D - Point Cloud** - Considers Smart 3D objects and point cloud objects for interferences. For Database Detect, this option must be selected to consider Smart 3D objects and point cloud objects. For Local Detect, select the **Smart 3D Point Cloud** check box to consider local interferences. The point cloud must have a valid connection to the model with no unresolved vendor licensing issues for this check box to be available.
4. In the **Include clearance** list, select the needed clearance rule. Clearance interferences are shown in green.
5. From the **Assign results to permission group** box, choose the permission group to which all the detected interferences are assigned.
6. In the **Marker size** field, type the value for the size of the interference symbols that generate in the model.
 

**TIP** Choose a marker size that is clearly readable, but one that does not interfere with the smaller details in the workspace view.

7. Click **Start** on the **Database Detect** tab. After you click **Start**, the **Status** tab on the **Interference Server Settings** dialog box displays the progress of the processing for parts that existed previously and for new or changed parts during the run.

**★IMPORTANT** If the IFC Server detects that your system resources are too low (due to a significant process requiring the majority of system memory), then the IFC process stops and displays a message box notifying you that the service has stopped for this reason. The IFC process will automatically attempt to restart when it runs out of memory.

### NOTES

- The Smart 3D Interference Detection service does not consume a license when it starts. It consumes a license only while processing the model. For more information, see
- To start the server interference detection process, you must have at least Read access to all objects in the model and Write access to the model itself. Access privileges are assigned for each permission group in the Project Management task. During the IFC process, if the software denies access to an object, the server process stops and a message appears.
- To view the status of the database interference detection process, right-click the **Interference Server** icon in the Project Management tree, and click **Properties**. On the **Interference Server Settings** dialog box, click the **Status** tab.
- When the database interference check process is running, only the **Stop** command is available. When the process is not running, the **Start** command and all process property gadgets are available. The **Stop** command is not available.
- When the database interference check is running and you add any permission group without Read permissions for the server, the server automatically receives Read permissions and finds collisions with the placed objects in that permission group.
- When you modify permission groups in Project Management, the host for the existing, running task does not receive the changes. To update the information, you must exit and restart the interference detection process.

## Check Interference Command

Checks the database or your workspace to verify that parts do not occupy the same volumetric space and that each part meets the design criteria for clearance. A successful interference check assures that there is sufficient space around the parts so that they can operate or be serviced properly, and be easily installed or removed when necessary. This command is available on the **Tools** menu.

### Check Interference Ribbon

Provides the following options related to the interference checking process at your workstation.

#### Settings

Displays the **Interference Checking Settings** dialog box. This dialog box allows you to specify the properties for the **Local Detect** interference. For more information, see *Interference Checking Settings Dialog Box* (on page 438). The **Database Detect** properties must be configured at the server in the Project Management task.

#### Show Interferences

Displays the types of interferences you specified on the **Display** tab of the **Interference Checking Settings** dialog box. These are the interferences that may exist for the objects

you select. For example, if you check **Clearance** as your interference type and **Edit** as the option for **Required Action** and then select four pipes in your workspace on which to run the interference check, the software displays only **Clearance** interferences for those four pipes when you select the **Show** command. If you do not select any parts, then interferences appear for all parts in the workspace.

#### **Hide Interferences**

Hides the interferences that exist for the currently selected parts. If you do not select any parts, then all interferences in the workspace are hidden. All **Local Detect** interferences in the workspace are automatically hidden when you select this option. For example, if four **Database Detect** and two **Local Detect** interferences appear and you select two of the **Database Detect** interferences to hide, the two **Database Detect** interferences you selected and all of the **Local Detect** interferences are hidden. Thus, your workspace contains only two cleared **Database Detect** interferences.

#### **Fit Interferences**

Fits the active graphic view to the parts that match the interference check criteria. For example, you might have six severe interferences and two of these interferences are between a pump and a boiler. If you select this pump and boiler and then click the **Fit** command on the **Check Interference** ribbon, the software fits only these two parts into the graphic view. If you do not select any of the six interferences, the **Fit** command is unavailable.

#### **Refresh Reference 3D Interferences**

Retrieves interferences between Reference 3D (R3D) objects. This option is available when an external 3D reference model has been attached to the model. For more information, see *Reference 3D Model* in the *Project Management User's Guide*.

**TIP** Click **Refresh Workspace** , **File > Refresh Workspace**, or press **F5** to retrieve interferences between all Smart 3D objects and all other object types. This includes interferences between Smart 3D and Reference 3D objects.

#### **List View**

Toggles the display of the **Interference List** dialog box. The list on this dialog box shows all interferences that currently appear in the workspace. The list automatically updates whenever you add an interference object to the workspace. You can add an interference from the **Local Detect** process, or when you select the **Refresh Workspace** or **Define Workspace** commands. For more information, see *Interference List Dialog Box* (on page 443).

#### **Required Action**

Displays the action required to deal with the selected interference. You cannot edit this option for local interferences.

**TIP** The choices in the **Required Action** box are controlled by the **IFC Required Action** select list in the Catalog task. For more information about select lists, see the *Catalog User's Guide* available from the **Help > Printable Guides** command in the software.

#### **Close**

Closes the **Check Interference** ribbon.

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## What do you want to do?

- Set interference checking parameters on a workstation (on page 435)
- Control interference display (on page 435)
- List interferences (on page 436)
- Change required action (on page 437)
- Display the interference status (on page 438)

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## Set interference checking parameters on a workstation

1. If the **Check Interference** ribbon is not currently displayed, select **Tools > Check Interference**, then click **Settings**  to display the **Interference Checking Settings** dialog box.
2. On the **Display** tab, set the display for each type of interference and the type of interference that appears based on the required action.
3. You can edit the values on the **Local Detect** tab. For example, you can assign interference checking priorities to aspects.  
    **! TIP** **Maintenance**, for example, is a typical aspect listed in the **Aspect** column. If a check of this aspect is important, then you can indicate the priority as **Required**. If **Maintenance** is not as important, then you can indicate the priority as **Optional** or **Not checked**.
4. Specify the interference comparison criteria.  
    **! TIP** In Local Detect, the software considers foreign objects referenced in the workspace by default.
5. Specify a rule in the **Include clearance rule** box, if necessary.
6. Specify the interference marker in the **Marker size** box.
7. When you have completed all your settings, click **Apply** and **OK** on the **Local Detect** tab.
8. To view the current interferences list, click **List View** .

## Control interference display

You can control the display of interferences with the **Check Interference** command. If interactive interference checking is not already running, click **Tools > Check Interference**.

Notice the three display-related buttons  on the **Check Interference** ribbon.

### Hide Interferences

1. To hide interferences, select the interference objects that you want to hide.
2. Click **Hide Interferences**  on the **Check Interference** ribbon.

## NOTES

- If you have not selected any objects to hide when you click this command, the software hides all the interferences in the model.
- You can clear acceptable interferences from your workspace by changing the required action and then editing the display properties for interferences. For example, in the **Required Action** column of the **Interference List**, select **None - Ignore the interference**. Then, clear the **None** box on the **Display** tab of the **Interference Checking Settings** dialog box.

## Show Interferences

Click **Show Interferences**  on the **Check Interference** ribbon.

## NOTE

- If you do not select any objects in the active view before clicking this command, the software displays the interferences for all parts in the workspace. To view interferences between specific objects, select these objects first and then click **Show Interferences**.

## Fit Interferences

1. Select the interference objects you want to fit from the graphic view or from the interference list shown in the list view.
2. Click **Fit Interferences**  on the **Check Interference** ribbon.

## *List interferences*

1. Select **Tools > Check Interference**.
2. Click **List View**  on the **Check Interference** ribbon.

## TIPS

- You must have at least one interference in your workspace in order for the **List View** button to be available.
- Double-click the **Row** button to view the properties for that interference. For more information, see *Interference Properties Dialog Box* (on page 445).

3. Review the list and edit rows as necessary. The following table provides a definition of each column property:

Column	Description	Instructions
<b>Name</b>	Name of the interference	Available only for Database Detect. You can edit the name from the <b>Properties</b> dialog box but not from the list view.
<b>Part A</b>	Name of the interfering part	Read only; you cannot edit.
<b>Part B</b>	Name of the interfering part	Read only; you cannot edit.

<b>Type</b>	Display of interference severity: <b>Severe, Clearance, Optional.</b>	Read only; you cannot edit.
<b>Required Action</b>	Provides a list with three choices: <b>Undefined, Edit, None.</b>	You can edit this box but not for interferences the local process detected.
<b>Last Modified</b>	Displays the date that the interference was found	Read only; you cannot edit.
<b>Notes</b>	Text entry field for other pertinent information	You can edit this box. Add additional information as needed. Does not apply to local interferences.

**NOTES**

- The **Interference List** automatically updates when you add an interference object to the workspace. This addition can be a local process interference, or database interferences loaded through the **Refresh Workspace** or **Define Workspace** commands. The software initially adds these additions to the bottom of the **Interference List**, but you can relocate them by sorting a column.
- Select a row in the **Interference List** to highlight the interference in the graphic views. The parts related to the interference also highlight.

**Change required action**

- Select **Tools > Check Interference**.  
The **Check Interference** ribbon appears.
- In a graphic view or in the interference list view, select an interference.
- On the ribbon, select an action in the **Required Action** box.

**TIP** The choices in the **Required Action** box are controlled by the **IFC Required Action** select list in the Catalog. For more information about select lists, see the *Catalog User's Guide* available from the **Help > Printable Guides** command in the software.

**NOTES**

- You can select the interfering objects from a graphic view or from the interference list. If you do not select any interferences, the **Required Action** box is unavailable on the ribbon.
- You can change the required action for database detect interferences but not for local interferences.

## Display the interference status

1. Select Tools > Check Interference.
2. Click **Settings**  on the **Check Interference** ribbon.
3. Select the **Status** tab on the **Interference Checking Settings** dialog box to view the status of the Interference Checking process.

## Interference Checking Settings Dialog Box

Provides options to change or accept the default properties for the interference marker size and the status of those interferences. Also, you can assign interference checking priorities to aspects and indicate whether the interferences are optional or required. Optionally, you can indicate if you want interference checking to include a clearance rule.

The **Interference Server Settings** dialog box at the server has two tabs: a **Database Detect** tab and a **Status** tab. However, the dialog box on your computer has four tabs: **Display**, **Database Detect**, **Local Detect**, and **Status**.

The **Status** tab provides current information on the progress of the Database Detect interference checking process running on the server. The progress of the Local Detect interference checking process appears at the bottom right corner of the application window when you are working in a task.

### See Also

*Check Interference Command* (on page 433)  
*Database Detect Tab (Interference Server Settings Dialog Box)* (on page 440)  
*Display Tab (Interference Dialog Box)* (on page 438)  
*Local Detect Tab (Interference Dialog Box)* (on page 441)  
*Status Tab (Interference Server Settings Dialog Box)* (on page 442)

### Display Tab (Interference Dialog Box)

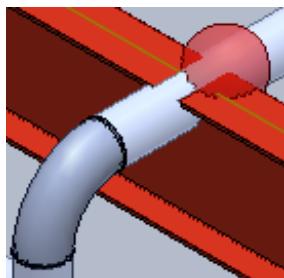
Defines which interferences you want to view in the model. This tab does not appear on the server.

#### Type

Displays the following types of interference:

- **Severe** - Select if you want to display the most critical interferences. They represent situations where a piece of equipment overlaps another piece of equipment or a pipe

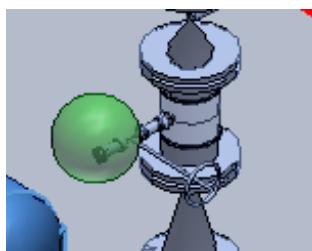
interferes with a beam. The symbol that is slightly transparent red represents this type of interference.



- **Optional** - Select if you want to display optional interferences, interferences that you must decide whether or not to accept. For example, the maintenance area of one piece of equipment overlaps the maintenance area of another. The symbol that is yellow represents this type of interference.



- **Clearance** - Select if you want to display clearance interference, interferences where two or more pieces of equipment do not meet the specification clearance criteria. The symbol that is green represents this type of interference.



#### Required Action

Displays the following interference options based on their associated required actions:

- **Undefined** - Select if you want undefined types of interferences to appear.
- **Edit** - Select if you want unacceptable types of interferences to appear.
- **None** - Select if you want acceptable types of interferences to appear.

## **Database Detect Tab (Interference Server Settings Dialog Box)**

Provides options for assigning interference checking priorities to aspects, specifying the comparison methods, and optionally including a clearance rule. You can also assign the interference results to a selected permission group. All properties on this tab when viewed outside the Project Management task are read-only.

**NOTE** You must run Database Detect before running the delivered Interference report. The Interference report is not intended to run on local interferences.

### **Server**

Specifies the name of the server on which the interference checking is processed for the identified model.

### **Property**

Specifies each aspect that you want to check. Lists all the object aspects that are identified for use in the mode, such as **Simple physical**, **Detailed physical**, **Insulation**, and **Maintenance**. This includes system-defined aspects and custom aspects.

### **Type**

Defines the checking you can apply to the selected aspect: **Required**, **Optional**, and **Not checked**. Choose the appropriate type for each aspect. **Not checked** means the selected aspect is not used for interference checking.

### **Compare**

Specifies the types of comparisons to perform to find interferences.

- **Required - Required** - Defines interferences classified as hard/hard. For example, one pipe physically intersects another pipe.
- **Required - Optional** - Defines interferences that are not as severe and are classified as hard/soft. For example, one pipe overlaps the optional maintenance aspect of the other object but does not actually intersect the other object.
- **Optional - Optional** - Defines interferences that are not severe and are classified as soft/soft. For example, the maintenance aspect of one piece of equipment overlaps the maintenance aspect of another.
- **Smart 3D - External Data** - Includes Reference 3D models, referenced MicroStation objects, and 3D AutoCAD files in interference checking. For Local Detect, the software by default considers objects in Reference 3D models, MicroStation, and 3D AutoCAD files that are in the workspace.

### **NOTES**

- This option only checks active model objects against R3D external objects. IFC also checks clashes between R3D objects belonging to different R3D projects. The option does not check for interferences between other external objects such as MicroStation to 3D AutoCAD.
- Reference 3D models that contain tessellated data take a significant amount of time for interference checking to process. For quicker IFC performance, set **Interference Detection to Do Not Participate**.
- **Smart 3D - Point Cloud** - Includes an attached point cloud during interference checking. The point cloud must have a valid connection to the model with no unresolved vendor licensing issues for this option to be available.

**Include clearance rule**

Specifies the clearance rule to add to the **Required** type of interference check.

**Assign results to permission group**

Specifies the permission group to which all the detected interferences are assigned. The list displays only those permission groups to which the server containing the interference checking software has write access.

**Marker size**

Specifies the size of the interference graphic marker. Choose a size that is clearly visible, but one that does not interfere with the smaller details in the workspace view.

**Start**

Begins the Local Detect interference checking process. This option is only available in the Project Management task.

**Stop**

Stops the Local Detect interference checking the process. This option is only available in the Project Management task.

***Local Detect Tab (Interference Dialog Box)***

Provides options for assigning interference checking priorities to aspects, specifying the compare methods, and optionally including a clearance rule.

**Activate local interference detection**

Starts the local interference checking process.

**Assign interference checking priority to aspects**

Select each aspect that you want checked and assign a priority to it.

- **Aspect** - Lists all the object aspects that are identified for use in the model. This includes the system-defined aspects and the user-defined aspects. Select those aspects in the **Aspect** column that apply to your objects, and then specify the type of comparison in the **Type** column.
- **Type** - Lists three types of checking you can apply to the selected aspect: **Required**, **Optional**, and **Not checked**. Choose the appropriate type for each aspect you select in the **Aspect** column. **Not checked** means the selected aspect is not used for interference checking.

**Compare**

Select which aspect types are to be compared against each other to find interferences.

- **Required - Required** - Defines interferences classified as hard/hard. For example, one pipe physically intersects another pipe.
- **Required - Optional** - Defines interferences that are not as severe and are classified as hard/soft. For example, one pipe overlaps the optional aspect of the other object but does not actually intersect the other object.
- **Optional - Optional** - Defines interferences that are not severe and are classified as soft/soft. For example, the maintenance aspect of one piece of equipment overlaps the maintenance aspect of another.

**Include clearance rule**

Specifies the clearance rule to add to the **Required** type of interference check.

**Marker size**

Specifies the size of the interference graphic marker. Choose a size that is clearly readable, but one that does not interfere with the smaller details in the workspace view.

***Status Tab (Interference Server Settings Dialog Box)***

Displays the status of the Database Detect process on the server. The status information includes the percentage of checking that has been completed, the amount remaining, when the process was started, and the estimated completion time.

The information on this tab is read-only.

**Model**

Displays the name of the model that is checked.

**New and modified parts at process start**

Displays the following time information for any new and modified parts after the process was started.

- **Last part modified** - Displays the date and time (mm/dd/yyyy hh:mm:ss) at which the last part was created or modified in the Model database.
- **Current range to** - Displays the date and time (mm/dd/yyyy hh:mm:ss) at which the last part modified was in consideration for interference checking.
- **From** - Displays the date and time (mm/dd/yyyy hh:mm:ss) at which the interference check completed checking the last part modified.
- **Elapsed time** - Displays the amount of time (hour, min, sec) during which the interference checking has been running for the new or changed parts.
- **Estimated completion** - Displays the amount of time (hour, min, sec) estimated until the interference checking process completes.

**Process start**

Displays the time (mm/dd/yyyy hh:mm:ss) the process started.

**Existing parts at process start**

Displays the following time information for existing parts when the process was started.

- **Current range to** - Displays the date and time (mm/dd/yyyy hh:mm:ss) at which the interference checking started for the existing parts.
- **From** - Displays the date and time (mm/dd/yyyy hh:mm:ss) at which the interference checking ended for the existing parts.
- **First part created** - Displays the date and time (mm/dd/yyyy hh:mm:ss) at which the first part was created in the database.
- **Elapsed time** - Displays the amount of time (hour, min, sec) during which the interference checking has been running for the existing parts.
- **Estimated completion** - Displays the amount of time (hour, min, sec) estimated until the interference checking process completes.

**Status message**

Displays textual information about the current status of the process on the server.

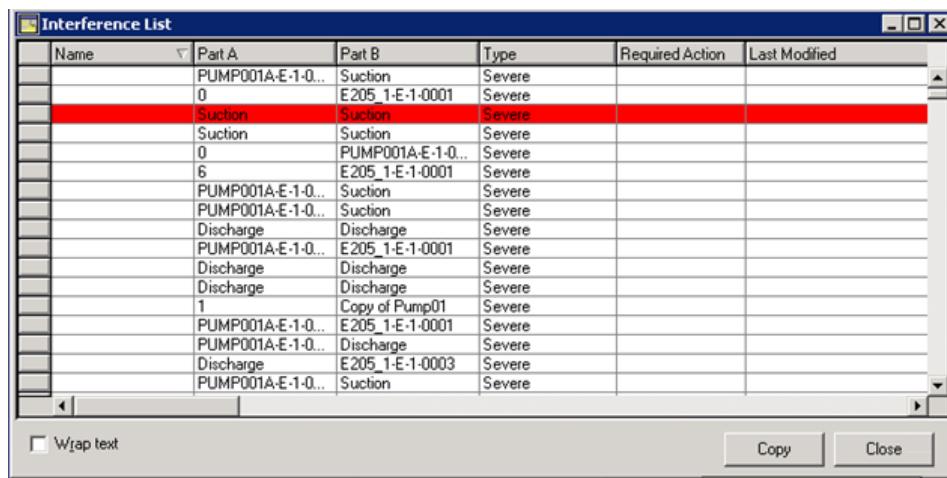
***Interference List Dialog Box***

Shows all the interferences that currently appear in the workspace. The list automatically updates whenever you add an interference object to the workspace. These interferences can come from the Local Detect process, or from database interferences loaded through the **Refresh Workspace** or **Define Workspace** commands. The software places the newly added interferences at the bottom of the list, where they remain until you sort them. You can view more columns and rows on the list by resizing the dialog box.

Pointing to a row in the list view highlights the row and simultaneously highlights the interference in your workspace.

Right-click a row to display the **Properties** for that row. For more information, see *Interference Properties Dialog Box* (on page 445).

You can alphabetize the interferences listed in the view by clicking the column header.



Name	Part A	Part B	Type	Required Action	Last Modified
PUMP001A-E-1-0...	Suction	Severe			
0	E205_1-E-1-0001	Severe			
Suction	Suction	Severe			
Suction	Suction	Severe			
0	PUMP001A-E-1-0...	Severe			
6	E205_1-E-1-0001	Severe			
PUMP001A-E-1-0...	Suction	Severe			
PUMP001A-E-1-0...	Suction	Severe			
Discharge	Discharge	Severe			
PUMP001A-E-1-0...	E205_1-E-1-0001	Severe			
Discharge	Discharge	Severe			
Discharge	Discharge	Severe			
1	Copy of Pump01	Severe			
PUMP001A-E-1-0...	E205_1-E-1-0001	Severe			
PUMP001A-E-1-0...	Discharge	Severe			
Discharge	E205_1-E-1-0003	Severe			
PUMP001A-E-1-0...	Suction	Severe			



Click this button to select the interference in that row. Double-click this button to display the properties for the interference in that row.

**Name**

Displays the read-only name of the interference. This field is blank for local interferences.

**Part A**

Displays the read-only name of the first part involved in the interference.

**Part B**

Displays the read-only name of the second part involved in the interference.

**Type**

Displays a read-only status of the severity of the interference: **Severe**, **Clearance**, or **Optional**.

### Required Action

Provides options for the action applied to the interference. You cannot edit the **Required Action** option for a local interference.

**TIP** The choices in the **Required Action** box are controlled by the **IFC Required Action** select list in the Catalog task. For more information about select lists, see the *Catalog User's Guide* available from the **Help > Printable Guides** command in the software.

### Last Modified

Displays the read-only date the interference was found or updated. This field is blank for local interferences.

### Notes

Provides a text box for typing comments about the interferences. For example, you can explain why you designated a certain interference as **Acceptable** or **Unacceptable**. This information can serve as a record of your actions. This field is blank for local interferences.

### Wrap text

Wraps the text on this dialog box for easier reading.

### Copy

Copies the selected rows to the clipboard. If you have no rows selected, this option copies all of the rows to the clipboard. This option copies the fields displayed on the dialog box, as well as the additional fields highlighted in the following figure:

B	C	D	E	F	G	H
{00004E2E-0000-0000-2305-7413B7541E04}	PUMP001A-E-1-0003	Simple physical	[00004E23-0000-0000-FD0E-7413B7541E04]	Suction	Simple physical	Severe
{00004E2E-0000-0000-AD05-7413B7541E04}	0 Simple physical	[00004E2E-0000-0000-5402-7413B7541E04]	E205_1-E-1-0001	Simple physical	Severe	
{00004E23-0000-0000-2805-7413B7541E04}	Simple physical	[00004E23-0000-0000-6C00-7413B7541E04]	Suction	Simple physical	Severe	
{00004E23-0000-0000-B90C-7413B7541E04}	Simple physical	[00004E23-0000-0000-6C00-7413B7541E04]	Suction	Simple physical	Severe	
{00004E2E-0000-0000-AD05-7413B7541E04}	0 Simple physical	[00004E2E-0000-0000-2420-7413B7541E04]	PUMP001A-E-1-0017	Simple physical	Severe	
{00004E2E-0000-0000-BB06-7413B7541E04}	6 Simple physical	[00004E2E-0000-0000-5402-7413B7541E04]	E205_1-E-1-0001	Simple physical	Severe	
{00004E2E-0000-0000-B40C-7413B7541E04}	PUMP001A-E-1-0007	Simple physical	[00004E23-0000-0000-6C00-7413B7541E04]	Suction	Simple physical	Severe
{00004E2E-0000-0000-F80E-7413B7541E04}	Simple physical	[00004E23-0000-0000-6C00-7413B7541E04]	Suction	Simple physical	Severe	
{00004E23-0000-0000-3705-7413B7541E04}	Simple physical	[00004E23-0000-0000-7D00-7413B7541E04]	Discharge	Simple physical	Severe	
{00004E2E-0000-0000-750C-7413B7541E04}	PUMP001A-E-1-0006	Simple physical	[00004E2E-0000-0000-5402-7413B7541E04]	E205_1-E-1-0001	Simple physical	Severe
{00004E23-0000-0000-C80C-7413B7541E04}	Simple physical	[00004E23-0000-0000-7D00-7413B7541E04]	Discharge	Simple physical	Severe	
{00004E23-0000-0000-000F-7413B7541E04}	Simple physical	[00004E23-0000-0000-7D00-7413B7541E04]	Discharge	Simple physical	Severe	
{00004E2E-0000-0000-E505-7413B7541E04}	1 Simple physical	[00004E2E-0000-0000-641C-7413B7541E04]	Copy of Pump01	Simple physical	Severe	
{00004E2E-0000-0000-F80E-7413B7541E04}	PUMP001A-E-1-0010	Simple physical	[00004E2E-0000-0000-5402-7413B7541E04]	E205_1-E-1-0001	Simple physical	Severe
{00004E2E-0000-0000-F80E-7413B7541E04}	Simple physical	[00004E23-0000-0000-7D00-7413B7541E04]	Discharge	Simple physical	Severe	
{00004E23-0000-0000-2305-7413B7541E04}	PUMP001A-E-1-0003	Simple physical	[00004E23-0000-0000-A901-7413B7541E04]	E205_1-E-1-0003	Simple physical	Severe
{00004E2E-0000-0000-5402-7413B7541E04}	Simple physical	[00004E2E-0000-0000-281C-7413B7541E04]	Pump01	Simple physical	Severe	
{00004E2E-0000-0000-B40C-7413B7541E04}	PUMP001A-E-1-0007	Simple physical	[00004E23-0000-0000-A901-7413B7541E04]	Suction	Simple physical	Severe
{00004E2E-0000-0000-F80E-7413B7541E04}	Simple physical	[00004E23-0000-0000-A901-7413B7541E04]	Suction	Simple physical	Severe	
{00004E2E-0000-0000-E505-7413B7541E04}	1 Simple physical	[00004E2E-0000-0000-2420-7413B7541E04]	PUMP001A-E-1-0017	Simple physical	Severe	
{00004E2E-0000-0000-5402-7413B7541E04}	E205_1-E-1-0001	Simple physical	[00004E2E-0000-0000-641C-7413B7541E04]	Copy of Pump01	Simple physical	Severe

The columns in the figure display the following information:

- B - The object ID (OID) for the first object involved in the interference.
- C - The name of the first object involved in the interference. This column corresponds to the **Part A** box.
- D - The aspect of the first object that the software used for the interference checking.
- E - The object ID (OID) for the second object involved in the interference.
- F - The name of the second object involved in the interference. This column corresponds to the **Part B** box.
- G - The aspect of the second object that the software used for the interference checking.

- H - The type of interference that the software found. This column corresponds to the **Type** box.

## **Interference Properties Dialog Box**

Sets options for a database interference. This dialog box also allows you to view any additional aspects involved in the interference and provides a box for you to add any explanatory notes. To access this dialog box, double-click a row button on the **Interference List** dialog box. For more information, see *Interference List Dialog Box* (on page 443).

**NOTE** The **Interference Properties** dialog box is available only for database interferences. Go to the **General Tab**, and click **Other Aspects** for all aspect interferences at the location. For local interferences, you can access the **Other Aspects** dialog box by double clicking the row button on the **Interference List**.

### **Topics**

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## **General Tab (Interference Properties Dialog Box)**

### **Category**

Select the class of properties you want to view or edit.

### **Other Aspects**

Displays a list of all aspect interferences for the interference. Because the interference checking process displays only the first aspect of interference at the location in the graphic view, this button allows you to check for all aspect interferences at that location. For more information, see *Other Aspects Dialog Box* (on page 446).

### **Name**

Specifies the name of the interference.

### **Name rule**

Specifies the naming rule to use for the interference.

### **Part A**

Displays the name of the first part involved in the interference.

### **Aspect A**

Displays the aspect of Part A that conflicts with the aspect of Part B.

### **Part B**

Displays the name of the part that conflicts with Part A.

### **Aspect B**

Displays the aspect of Part B that conflicts with the aspect of Part A.

### **Type**

Displays the type of interference: **Severe**, **Optional**, or **Clearance**.

**Check date**

Displays the date the interference was located.

**Required Action**

Provides a box to accept the displayed option for the **Required Action** of the selected part. You can change the required action by selecting another option. This box is unavailable if the interference is from the Local Detect process.

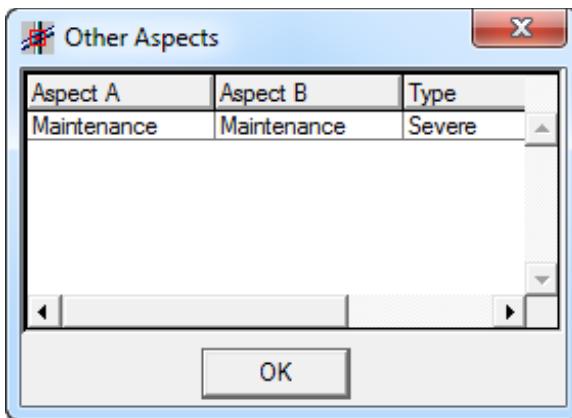
**Notes**

Provides a box for typing comments about the interferences. For example, you can explain reasons for designating a certain interference as **Acceptable** or **Unacceptable**. This information can serve as a record of your actions. This box is unavailable if the interference is from the Local Detect process.

***Other Aspects Dialog Box***

Provides a list of all object aspects involved in the interference. This dialog box appears when you click **Other Aspects** on the *Interference Properties Dialog Box* (on page 445). The interference checking process shows only the first aspect of interference in the graphic view. Click **Other Aspects** when you want to see all the aspects involved at the interfering location.

**NOTE** For local interferences, you can access this dialog box by double-clicking the row button on the **Interference List** dialog box.

**Aspect Part A**

Displays the aspect for part A that conflicts with the aspect for Part B.

**Aspect Part B**

Displays the aspect for part B that conflicts with the aspect for Part A.

**Type**

Displays the type of interference between the two aspects: **Severe**, **Optional**, or **Clearance**.

## Configuration Tab

Displays the creation, modification, and status information about an object.

**NOTE** You cannot define the filters using the **Configuration** tab.

### Plant

Displays the name of the model. You cannot change this value.

### Permission Group

Specifies the permission group to which the object belongs. You can select another permission group, if needed. Permission groups are created in Project Management.

### Transfer

Reassigns ownership of the selected model objects from their current permission group to another satellite or host permission group. This option is only available if the active model or project is replicated in a workshare configuration. The option is not available if all of the objects in the select set already belong to another location and are non-transferable. For more information, see *Transfer Ownership Dialog Box* in the *Common User's Guide*.

**NOTE** The **Transfer** option does not apply to the filters and surface style rules.

### Approval State

Specifies the current status of the selected object or filter. The display depends on your access level. You might be unable to change the status of the object. The list is defined by the ApprovalStatus codelist.

**NOTE** You can only edit or manipulate an object with a status of **Working**.

### Status

Specifies the location of the object in the workflow process. Changing this property sets the **Approval State**. The list is controlled by the ApprovalReason codelist in the ApprovalReason.xls file. You must bulkload this file. For more information, see *ApprovalReason* in the *Reference Data Guide*.

### Date Created

Specifies the creation date of the object.

### Created by

Specifies the name of the person who created the object.

### Date Last Modified

Specifies the date when the object was last modified.

### Last Modified by

Specifies the name of the person who last modified the object.

## Run Report

Runs an existing catalog or personal report. By default, all reports generated with this command are in Microsoft® Excel format (.xls). However, customization using XML operations can result in a report in various other formats. You can use the **Tools > Run Report** command to generate reports in any of the 3D tasks. You can review each completed report with Excel.

Reports are divided into two overall categories: catalog reports and personal reports. Catalog reports include report templates delivered with the software and templates that a reports designer has created. Personal reports use templates you create and save.

Depending on the report definition, you may need to specify additional information such as filters or parameters when running a report. Here are some examples.

- Specifying a filter on the *Select Filter Dialog Box* (on page 366).
- Specifying inputs for an asking filter on the *Filter Properties Dialog Box* (on page 368).
- Specifying parameters on the *Report Parameters Dialog Box* (on page 451).

If a required filter does not exist, a message appears asking you to create the required Catalog filter. When you have provided the necessary information, the command displays the report in Excel.

The **Tools > Options** command allows you to specify the location of personal report templates and report output. On the **File Locations** tab, you can specify **Personal Report Templates** and **Reports Output** locations. You can change these locations to identify any folder accessible from your computer.

If any errors occur during the processing of a report, the command generates an error log called *SP3DReports.log* in your local *Temp* folder.

### ■ NOTES

- Reports can have a maximum of 65,536 rows. If a report reaches the maximum, the printing stops. A log file alerts you about the limit with this message: **Excel sheet limit (65,536 rows) was reached.**

For information about creating the Report databases, see the *Smart 3D Installation Guide* available from the **Help > Printable Guides** command in the software.

- In the Drawings and Reports task, you can create, modify, update, save as another file, print, and run personal reports. Also, you can save reports to the catalog to be used by other users or publish the reports in an integrated environment. For information on creating report templates or report deliverables, see the *Reports User's Guide*.
- Microsoft Excel 2010 32-bit is the supported version for the Drawings and Reports task. Click **File > Excel Options**. Go to the **Trust Center** category and select the **Trust Center Settings** button. Select the **Macro Settings** category and check **Trust access to the VBA project object model**.

For more information about Microsoft Office and service packs, refer to the *Microsoft web site* (<http://www.microsoft.com/>).

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### What do you want to do?

- *Run an Existing Catalog Report* (on page 453)
- *Run an Existing Personal Report* (on page 453)

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## Run Report Dialog Box

Runs a specified type of report. You can select a catalog report from the list on the **Catalog Reports** tab, or select a personal report from the list on the **My Reports** tab. You can also view the properties of catalog reports.

### Topics

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## **My Reports Tab (Run Report Dialog Box)**

Selects a personal report template from the list and runs it. All reports are in Microsoft Excel® format (.xls). You can create and modify report templates in the Drawings and Reports task and save them to the catalog. Set the **Personal Report Template** option on the **Tools > Options > File Locations Tab (Options Dialog Box)** (on page 518) to the location of your personal report (.rpt) files.

### Available report templates

Lists all of your personal report templates currently available.

### File name

Displays a descriptive name for the report output file.

### Browse

Displays the **Select Report** dialog so you can open a report template from a different location.

### Use Select Set

Specifies that the report only return records associated with the objects in the select set.

### Run

Runs the selected report. If the report requires additional input, such as a filter or parameter, the command displays the necessary dialog boxes, such as the *Select Filter Dialog Box* (on page 366), *Filter Properties Dialog Box* (on page 368), and *Report Parameters Dialog Box* (on page 451).

 **NOTE** When creating a Catalog filter, filter names are case-sensitive.

## Catalog Reports Tab (Run Report Dialog Box)

Specifies a catalog report template from the list and runs it. All reports are in Microsoft Excel format (.xls).

 **NOTE** If a button is grayed out, it is not available with the **Run Report** command. You can create new report templates in the Drawings and Reports task.

### Available report templates

Lists all of the catalog report templates currently available in an expandable hierarchy.

 **TIP** For a listing of which engineering check report to run for which piping part class, refer to the "Engineering Check Reports: Piping Parts" topic in the *Catalog User's Guide*.

#### Properties

Opens the **Properties** dialog box. For more information, see *Properties Dialog Box* (on page 451).

#### List view

Displays the template properties in a list format.

#### Grid view

Displays the template properties in a grid format.

### File name

Displays a descriptive name for the report output file.

### Browse

Displays the **Select Report** dialog so you can open a report from a different location.

### Use Select Set

Specifies that the report only return records associated with the objects in the select set.

### Run

Runs the selected report. If the report requires additional input, such as a filter or parameter, the command displays the necessary dialog boxes, such as the *Select Filter Dialog Box* (on page 366), *Filter Properties Dialog Box* (on page 368), and *Report Parameters Dialog Box* (on page 451).

 **NOTE** When creating a Catalog filter, filter names are case-sensitive.

## Report Parameters Dialog Box

Specifies parameters for a report deliverable, such as units of measure and coordinate systems.

This dialog box only displays when you run a report that requires parameter input. In addition, the controls on this dialog box may vary, depending on the report definition. For more information on configuring parameters for a report, see *Design Layout* in the *Reports User's Guide*.

### Unit of Measure

Sets the units of measure for the report.

### Matrix

Specifies information about the coordinate system. For more information about the columns displayed in the matrix, see *Unit of Measure Dialog Box (Label Editor)* in the *Common User's Guide*.

### NOTES

- For some reports, several dialog boxes requiring report parameters display. The dialog boxes take the form of a wizard with **Back**, **Next**, and **Finish** at the bottom.
- The query you set up for running a report can generate dialog boxes that prompt for certain report parameters. In this way, your query can customize the report creation.

## Properties Dialog Box

Displays the general properties and configuration of a selected report or label. This dialog box does not allow you to change the properties of the template.

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### **Definition Tab (Properties Dialog Box)**

Displays the general properties and property values of a selected report template.

#### Property

Displays the properties of a selected report template. These properties typically include the template name, description, and type. The type can be a standard report template or a catalog report template.

#### Value

Displays the value of each property that appears in the **Property** column.

#### See Also

*Properties Dialog Box* (on page 451)

## Configuration Tab

Displays the creation, modification, and status information about an object.

**NOTE** You cannot define the filters using the **Configuration** tab.

### Plant

Displays the name of the model. You cannot change this value.

### Permission Group

Specifies the permission group to which the object belongs. You can select another permission group, if needed. Permission groups are created in Project Management.

### Transfer

Reassigns ownership of the selected model objects from their current permission group to another satellite or host permission group. This option is only available if the active model or project is replicated in a workshare configuration. The option is not available if all of the objects in the select set already belong to another location and are non-transferable. For more information, see *Transfer Ownership Dialog Box* in the *Common User's Guide*.

**NOTE** The **Transfer** option does not apply to the filters and surface style rules.

### Approval State

Specifies the current status of the selected object or filter. The display depends on your access level. You might be unable to change the status of the object. The list is defined by the ApprovalStatus codelist.

**NOTE** You can only edit or manipulate an object with a status of **Working**.

### Status

Specifies the location of the object in the workflow process. Changing this property sets the **Approval State**. The list is controlled by the ApprovalReason codelist in the ApprovalReason.xls file. You must bulkload this file. For more information, see *ApprovalReason* in the *Reference Data Guide*.

### Date Created

Specifies the creation date of the object.

### Created by

Specifies the name of the person who created the object.

### Date Last Modified

Specifies the date when the object was last modified.

### Last Modified by

Specifies the name of the person who last modified the object.

## Run an Existing Catalog Report

1. Click **Tools > Run Report**.
2. On the **Run Report** dialog box, go to the **Catalog Reports** tab.
3. Expand the tree view to select the category for your report (such as **Piping** or **Equipment**), and select the report template you want to use.
4. Optionally, type a name for the output file in the **File name** box, and click **Browse** to locate the report template to use.
5. To run the report on objects in the select set, check the **Use Select Set** option.
6. Click **Run**. If the report requires additional input, such as a filter or parameter, the command displays the necessary dialog boxes, such as the *Select Filter Dialog Box* (on page 366), *Filter Properties Dialog Box* (on page 368), and *Report Parameters Dialog Box* (on page 451).

### NOTES

- Before running a report, confirm your system administrator has created the necessary reporting databases; that is, the Reports database must exist before you can run a report.
- If you attempt to run a report template but the Reports database does not exist, the software displays the message **Cannot get Reports Database connection**. Contact your system administrator for the prerequisite databases.
- You can define the path to your output report in advance by clicking **Tools > Options** and then selecting the **File Locations** tab.
- Some templates require you provide some additional information. This information is based on the particular criteria you select for your report.
- Reports can have a maximum of 65,536 rows. If a report reaches the maximum, a message in the error log of the software alerts you: **Excel sheet limit (65,536 rows) was reached**.
- If you click **No** to avoid overwriting an existing report, the software displays the **Browse** dialog box so you can specify a different report name.

### See Also

*Run Report* (on page 448)

## Run an Existing Personal Report

1. Set the **Personal Report Template** option on the **Tools > Options File Location** tab to the location of your personal report (.rpt) files.
2. Click **Tools > Run Report**.
3. On the **Run Report** dialog box, go to the **My Reports** tab.
4. Select the report template you want to run.
5. Type a name for the output file in the **File name** box.
6. To access folders with available reports you have created, click the **Browse** button and locate the file with the **Select Report** dialog box.
7. Click **Run**. If the report requires additional input, such as a filter or parameter, the command displays the necessary dialog boxes, such as the *Select Filter Dialog Box* (on page 366),

*Filter Properties Dialog Box* (on page 368), and *Report Parameters Dialog Box* (on page 451).

## NOTES

- If you attempt to run a report template but the Reports database does not exist, the software displays the message **Cannot get Reports Database connection**. Contact your system administrator for the prerequisite databases.
- Because each user can generate personal reports, the **My Reports** folder is initially empty.
- You can add report files to the personal report template folder either by copying the files to the folder or with the **Save Report Template As** command. For more information, see *Save Report Template As* in the *Smart 3D Reports User's Guide*.
- If you click **No** to avoid overwriting an existing report, the software displays the **Browse** dialog box so you can specify a different report name.
- Reports can have a maximum of 65,536 rows. If a report reaches the maximum, a message in the error log of the software alerts you: **Excel sheet limit (65,536 rows) was reached**.

## See Also

*Run Report* (on page 448)

## Drawing Console

Allows you to create new drawings and manage existing drawings without switching to the Drawings and Reports task. You can edit and update drawing documents through using the **Tools > Drawing Console** command. The **Drawing Console** is a free-floating, resizable form which shows you the same hierarchy of folders and components as you see in the **Management Console** in the Drawings and Reports task. Unlike the Drawings and Reports task where the documents are displayed in the **Detail View**, drawing and report documents are included in the **Drawing Console** hierarchy.

The **Drawing Console** allows you perform the same operations as the **Management Console** with a few exceptions:

- Spreadsheet report documents have no **Edit Template** command. Go to the Drawings and Reports task to edit the templates.
- The **Open** command is not available on drawing documents. Right-click a drawing and select **Edit** to open it in SmartSketch Drawing Editor.
- You create new composed drawings by right-clicking the composed drawing component and selecting **New Drawing** on the shortcut menu.

### Commands Available Through the Drawing Console

Command	Description
Copy	Copies the Console hierarchy from the selected component down. The copy command does not copy documents.
Copy Report to Catalog	Copies a modified report template to the catalog so it can be used by other users.
Create Document	Generates the drawings that have not previously been created.

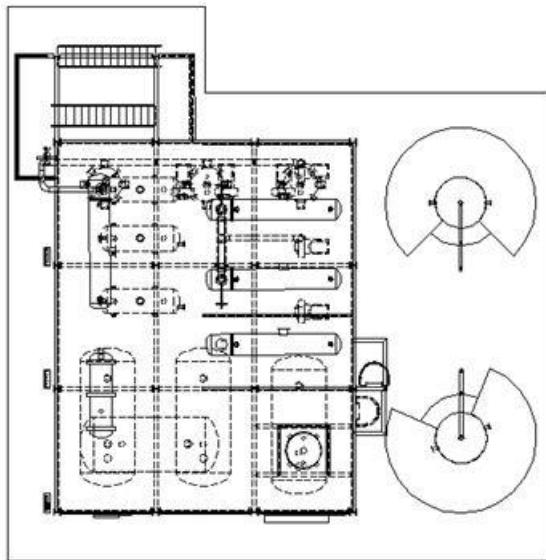
Command	Description
Create Report	Specifies a report template and then generates a report for the selected spreadsheet component.
Delete	Removes an item and its sub-items from the hierarchy and the database.
Edit	Opens a drawing document in SmartSketch Drawing Editor for editing.
Edit Options	Sets various options that affect piping isometric drawing output, such as dimension styles, layers, drawing frame text, material lists, and weld lists. Displays the Isometric Style Options Browser.
Edit Template	Allows you to modify a template for a volume drawing component in SmartSketch Drawing Editor.
New	Create a new folder or component in the hierarchy.
New Drawing	Creates a new composed drawing. This command is only available on the shortcut menu for a selected Composed Drawing component.
Parameters	Specifies the parameters for a report, such as units of measure and coordinate systems.
Paste	Inserts the last-copied contents into the hierarchy, modifies the template information, or creates drawing volumes, depending on the component you have selected.
Print Batch > Print	The simple Print command sends a print request for the selected documents to the default printer. The Batch > Print command allows you to submit document files directly to a print queue for a printer or schedule the document files to be sent to the print queue at a later date or at recurring intervals. If the Batch command is not available, you are not configured to use batch processing. Contact your administrator for more information.
Properties	Views and edits properties for the selected document.
Publish	Publishes the information in the selected documents. You can access the Publish Documents command by right-clicking a component or document. This command is only available if you are registered to work in an integrated environment.

Command	Description
Refresh Batch > Refresh	Compares the date of the last update of the document with the modification date in the model for any object that has a positive (can be seen) resymbolization in the drawing. The Batch > Refresh command allows you to refresh documents on a Batch Server while you continue to work on other tasks. If the Batch command is not available, you are not configured to use batch processing. Contact your administrator for more information. The Refresh and Batch > Refresh commands are not available for Spreadsheet Report documents.
Rename	Activates the name of an item in the hierarchy so you can type a different name.
Revise	Reserves revision numbers. This command is only available if you are registered to work in an integrated environment.
Run Query	Runs the query associated with the selected Drawings by Query Manager component.
Save As	Saves drawings and reports as specified file types to an external location, such as a share on another server.
Save Package	Saves the console hierarchy from the selected component down. The package saves the setup information and any template definitions that may exist on nodes within the selected hierarchy.
Save As SmartPlant Review	Saves a 3D Model Data document as a SmartPlant Review file.
Setup	Defines the options for a component, such as the Drawings by Query components or the 3D Model Data component.
Update Update Now Update Documents Batch > Update Batch > Local Update	The Update Document(s) and Update commands query the model to regenerate a single document or multiple documents. The Update Now command always performs a complete regeneration on the local machine for a single selected drawing. The Batch > Update command allows you to update documents on a Batch Server while you continue to work on other tasks. The Batch > Local Update command is a special batch command available on a document, allowing you to background-process the update of the document. If the Batch commands are not available, you are not configured to use batch processing. Contact your administrator for more information.
View Log	Displays the log information for the selected document.
View Extraction Data	Displays part and report information for a line that has been processed. You can view the log file and Piping Component File (PCF) data for the extraction. This command is available for Piping Isometric Drawings only.

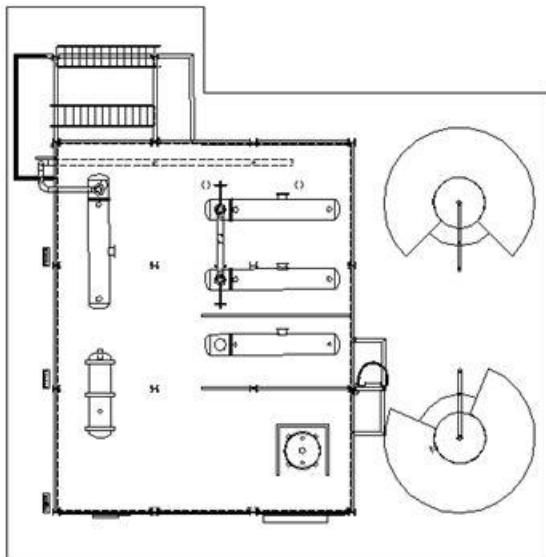
## Snapshot View

Creates a view and a volume you can place on a drawing sheet when editing a composed drawing. You can choose a snapshot view by selecting the available snapshot commands:

- **All Objects** - Displays all objects in the view.



- **Visible Objects Only** - Displays only the visible objects in the view. Objects that are partially visible when the snapshot is taken are captured in the drawing, even if it includes hidden edges. For example, if a pipe has visible and hidden edges, the hidden edges are also included in the view.



When you select **Tools > Snapshot View > All Objects**, a ribbon appears allowing you to pick a composed drawing component, name the snapshot view, and assign a view style. When you

select **Tools > Snapshot View > Visible Objects Only**, a composed drawing sheet must be selected, and a ribbon appears allowing you to name the snapshot view and assign a view style.

After you select the information you want, the software captures the view when you click **Finish**. The view is associated with the composed drawing component you selected on the ribbon, or with the selected composed drawing sheet.

You can create additional snapshot views by updating the graphic view contents and then clicking **Finish** again.

## NOTES

- You must have appropriate permissions to access composed drawing types, or you cannot use the **Snapshot View** command. If you have only read permission, you receive a message that alerts you to this condition.
- We highly recommend you use clipping to produce better results in your snapshot views. If the graphic view is clipped, the volume created uses the clipping boundaries as its volume boundaries. If the view is not clipped, then the command uses the extents of the graphic view window as its top/bottom/left/right boundaries and the range of the objects as its front and back boundaries.

After you create the snapshot views, you can use the **Tools > Drawing Console** command to edit a composed drawing in SmartSketch Drawing Editor, then place snapshot views using SmartSketch Drawing Editor **Place Snapshot View** command. For more information on creating drawings in a 3D task, see *Drawing Console* (on page 454). For additional information on the SmartSketch Drawing Editor commands, see the SmartSketch Drawing Editor Help.

## Snapshot View Ribbon

Sets options for snapshot views. You can place snapshot views on composed drawings when you open them in SmartSketch Drawing Editor. You display this ribbon by selecting **Tools > Snapshot View**.

### Finish

Saves the snapshot view with the options you specified on this ribbon. If you are using **Visible Objects Only**, clicking **Finish** opens the selected drawing and starts the **Place Snapshot View** command.

### Selected Set

Indicates that the snapshot view should only include selected objects. For example, if a view contains a pipe and a pump, but this toggle is activated and only the pump is selected, only the pump is included in the updated drawing. This option is only available for the **All Objects** command.

### Drawing type

Displays the last ten composed drawing selections you have made. Select a composed drawing type to associate with the snapshot view. Select **More** for an extended list of composed drawing types. This option is only available for the **All Objects** command.

### View name

Specifies a name for the snapshot view. You can type a maximum of 40 characters for the view name. When you place the snapshot view in a drawing open in SmartSketch Drawing Editor, this is the view name you want to associate with your snapshot drawing view. For information on the **Place Snapshot View** command, see the SmartSketch Drawing Editor

Help.

#### Naming rule

Select a naming rule to name the snapshot view. The last rule that you selected is displayed as the default. To override this default, you can select a different naming rule. Select **More** for an extended list of naming rules.

#### View style

Displays the last style you selected. You can specify a different view style to control the appearance of objects in the finished drawing. Select **More** for an extended list of view styles. You can create and edit view styles in the Drawings and Reports task.

#### Space folder

Specifies the Space folder where you want to store the drawing volume created by the command.

#### Generate Preview

If checked, displays a preview of the snapshot view when you click **Finish**. This option is only available when you create a snapshot view with the **All Objects** command.

## Create a snapshot view containing all objects

Before using the **Tools > Snapshot View > All Objects** command in the Common task, a composed drawing component must exist. If one does not exist, you can create a composed drawing component using the **Tools > Drawing Console** command. For more information, see *Drawing Console* (on page 454).

1. In the Common task, use commands such as **Define Workspace**, **Clip by Object**, **Show/Hide**, or **Named Views** to manipulate the view to produce the view that you want to capture.
2. From any 3D modeling task, click **Tools > Snapshot View > All Objects**.

*The Snapshot View ribbon appears.*

3. Select the composed drawing component you want in the **Drawing type** box. Select **More** to display the **Select Drawing Type** dialog box for more options.
4. Type a name for the view in the **View name** box. When you place the snapshot view in a drawing open in SmartSketch Drawing Editor, this is the view name you want to associate with your snapshot drawing view. If you prefer to use a naming rule, select one from the **Naming rule** drop-down.

#### • TIPS

- You can type a maximum of 40 characters for a view name.
- If you select **User Defined** as the view name, the **Finish** button disables after you click it the first time. You have to key in a different name. If you use a naming rule, the software automatically moves to the next name based on the rule.

5. Select a drawing view style in the **View style** box. You can use any orthographic view style.
6. In the **Space folder** field, specify where you want the snapshot view volume stored. Select **More** to display the **Select Space Folder** dialog box for a list of available folders.
7. Click **Finish** to store the snapshot view.

The software creates a volume for the view. You can view the volume listed on the **Space** tab of **Workspace Explorer**.

**! TIP** You can create additional snapshot views by updating the graphic view contents and then clicking **Finish** again.

You can now open an existing composed drawing or create a new composed drawing and place snapshot views using the **Place Snapshot View** command in SmartSketch Drawing Editor. For more information on creating drawings in a 3D modeling task, see *Drawing Console* (on page 454). For additional information on the SmartSketch Drawing Editor commands, see the SmartSketch Drawing Editor Help.

### **■ NOTES**

- You must have appropriate permissions to access composed drawing types, or you cannot use the **Snapshot View** command. If you have only read permission, you receive a message that alerts you to this condition.
- We highly recommend you use clipping to produce better results in your snapshot views. If the graphic view is clipped, the volume created uses the clipping boundaries as its volume boundaries. If the view is not clipped, then the command uses the extents of the graphic view window as its top/bottom/left/right boundaries and the range of the objects as its front and back boundaries.

## Create a snapshot view containing only visible objects

Before using the **Tools > Snapshot View > Visible Objects Only** command in the Common task, a composed drawing sheet must exist.

1. In the Common task, use commands such as **Define Workspace**, **Clip by Object**, **Show/Hide**, or **Named Views** to manipulate the view to produce the view that you want to capture.
2. From any 3D modeling task, click **Tools > Snapshot View > Visible Objects Only**.

The **Snapshot View** ribbon appears.

**! NOTE** If a composed drawing is not already open, the **Select Drawing** dialog box displays. Select a composed drawing sheet and click **OK**.

3. Type a name for the view in the **View name** box. When you place the snapshot view in a drawing open in SmartSketch Drawing Editor, this is the view name you want to associate with your snapshot drawing view. If you prefer to use a naming rule, select one from the **Naming rule** drop-down.

### **! TIPS**

- You can type a maximum of 40 characters for a view name.
- If you select **User Defined** as the view name, the **Finish** button disables after you click it the first time. You have to key in a different name. If you use a naming rule, the software automatically moves to the next name based on the rule.

4. Select a drawing view style in the **View style** box. You can use any orthographic view style.
5. In the **Space folder** field, specify where you want the snapshot view volume stored. Select **More** to display the **Select Space Folder** dialog box for a list of available folders.
6. Click **Finish** to store the snapshot view.

The selected composed drawing sheet opens.

7. Use the **Place Snapshot View** command to place the snapshot view on the drawing sheet. Click and drag the mouse on the drawing sheet to place the view.
8. Specify the snapshot view properties in the **Snapshot View** ribbon displayed above the drawing area.

**NOTE** You can right-click the view, and then select **Properties** to change the style or scale used in the snapshot view.

*When the view is placed, it is automatically updated.*

**NOTE** We highly recommend you use clipping to produce better results in your snapshot views. If the graphic view is clipped, the volume created uses the clipping boundaries as its volume boundaries. If the view is not clipped, then the command uses the extents of the graphic view window as its top/bottom/left/right boundaries and the range of the objects as its front and back boundaries.

## Select View Style Dialog Box

Specifies a view style to associate with the snapshot view you are creating. This dialog box opens when you click **More** in the **View Style** box while you are completing the **Tools > Snapshot View** command. Before you create a snapshot view using this command, you must have added at least one composed drawing component using the **Tools > Drawing Console** command. The **Choose View Style** dialog box provides a tree view to select the view style that you want. For more information, see *Drawing Console* (on page 454).

## Select Drawing Type Dialog Box

Specifies a composed drawing component to associate with the snapshot view you are creating. This dialog box opens when you click **More** in the **Drawing Type** field while you are completing the **Tools > Snapshot View** command. Before you create a snapshot view using this command, you must add at least one composed drawing component using the **Tools > Drawing Console** command. The **Select Drawing Type** dialog box provides a tree view to select the type you want.

## Select Naming Rules Dialog Box

Specifies a naming rule that assigns a name to the snapshot view you are creating with the **Tools > Snapshot View** command. The last naming rule you selected serves as the default. If you select **More**, the **Select Naming Rules** dialog box opens and provides additional options. Before you create a snapshot view using this command, you must have added at least one composed drawing component using the **Tools > Drawing Console** command. For more information, see *Drawing Console* (on page 454).

## Select Space Folder Dialog Box

Specifies a parent for a folder or volume in the space hierarchy. This dialog box appears when you select **More** in the **Parent** box on the **Create Space Folder** ribbon. When you select **More** in the **Space folder** boxes on the volume creation and modification ribbons.

### Look In

Specifies from which location you want the software to pull hierarchical information. You can retrieve hierarchical information from the workspace or from the entire model database.

## Custom Commands

Provides end-user application programming capability for the 3D software. Using Microsoft® Visual Basic, you can create a custom command that groups a series of commands and instructions into a single command that runs as an operation in the 3D software. As a result, you can access the customized commands that directly relate to the work routine in your operation.

Use the **Visual Basic Command Wizard** to help you build a custom command. For example, the wizard's first step prompts you to identify general information including command name, project name, author, and company. Start the wizard in Visual Basic by clicking **Command Wizard** on the **Add-Ins** menu. For more information about installing the Command Wizard and other programming resources, see the *Intergraph Smart™ 3D Installation Guide*, available by clicking **Help > Printable Guides** in the software.

After adding a custom command in the 3D software, you can edit it using the **Edit Custom Command** dialog box which requires you to specify the program identifier (prog\_id), command name and description, command priority, and a command line of arguments in a string.

### Delivered Custom Commands

The following list provides descriptions and ProgIDs for the delivered custom commands. For more information consult the *Database Integrity (DBI) Guide* and the *Common User's Guide (Tools Menu > Custom Commands)*. Both are available from **Help > Printable Guides**.

<b>Custom Command</b>	<b>Check Database Integrity</b>
<b>ProgID</b>	SP3DCheckDatabaseIntegrity.CCheckObj
<b>Description</b>	<p>Creates records for the objects that need to be cleaned. Run this custom command directly on a database (site, catalog, or model). Then, you can generate a report to review the errors that the Check Database Integrity command generated.</p> <p>For more information on this command, see the <i>Database Integrity Guide</i>.</p>

<b>Custom Command</b>	<b>Clean Database</b>
<b>ProgID</b>	SP3DCleanDatabaseCmd.CCheckObj

<b>Description</b>	Deletes or cleans an object. Use this command when an action on the Check Database Integrity report is To Be Removed or To Be Repaired.  For more information on deleting and cleaning objects in the database, see the <i>Database Integrity Guide</i> .
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<b>Custom Command</b>	<b>Create Drawing View</b>
<b>ProgID</b>	MenuDrawView.CMenuDrawView
<b>Description</b>	<p>Saves and converts the contents of a three-dimensional graphic view window into a snapshot view. This command creates a rectangular object associated to a clipping volume, or volumes, in the three-dimensional model.</p> <p>Before you create a snapshot view using this command, you must have added at least one composed drawing type to the Management Console in the Drawings and Reports task.</p> <p>You can save additional views by updating the view contents and then saving the new design. If you used the <b>Tools &gt; Hide</b> command to avoid displaying certain objects, those objects are included in a composed drawing you create.</p> <p>To use the <b>Tools &gt; Snapshot View</b> command, you must have appropriate permissions to access composed drawing types. If you have only read permission, you receive a message that alerts you to this condition.</p> <p>After you create the snapshot views, you can add them to composed drawings when you use the <b>Tools &gt; Drawings Console</b> command.</p>

<b>Custom Command</b>	<b>Duplicate Part Numbers</b>
<b>ProgID</b>	DuplicatePartNumbers,Ingr.SP3D.ProjectMgmt.Client.Commands.DuplicatePartNumbersCommand
<b>Description</b>	<p>Repairs duplicate parts that exist in the catalog, including any proxies that might also exist in all the associated models. The command is available only when you have selected a catalog in the Project Management tree.</p> <p><b>★IMPORTANT</b> In a Global Workshare environment, you must run this command only from the host location.</p>

<b>Custom Command</b>	<b>Find Object by OID</b>
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<b>ProgID</b>	SP3DFFindObjectByReport.FindObjects
<b>Description</b>	<p>Finds objects with integrity problems in a graphic view. Before running this command, you must define your workspace to include these objects. Run a database integrity report, and use the reported OIDs of the objects in the workspace definition.</p> <p>For more information on this command, see the <i>Database Integrity Guide</i>.</p>

<b>Custom Command</b>	<b>Fix Project Root</b>
<b>ProgID</b>	SP3DPRJMGTRepairCmd.FixCnfgProjectRoot
<b>Description</b>	<p>Synchronizes the model name in the model database and the site database. The name in the site database prevails.</p> <p>You must run this command from a task in the model, not from Project Management.</p>

<b>Custom Command</b>	<b>Large Sector Utility</b>
<b>ProgID</b>	DwgBinaryEditorCmd.FixSectorSize
<b>Description</b>	Converts existing production drawings from a small to a larger sector format to avoid exceeding Microsoft structured storage limits and causing errors to occur.

<b>Custom Command</b>	<b>Model Data Reuse (MDR) Validation Tool</b>
<b>ProgID</b>	MDRValidation.CValidateGeometry
<b>Description</b>	Helps you in analyzing the MDR results. If MDR is performed across models, you must run this tool on both the source and the destination models to enable analysis of the results. The tool locates the objects in the model that failed to copy as well as the objects that have a data mismatch with the source and the destination.

<b>Custom Command</b>	<b>Modify Style</b>
<b>ProgID</b>	ModifyStyleCmd.ModifyStyles

<b>Description</b>	Modifies system-based styles existing in a custom model database. For information on creating correct style colors, see <i>Format Style</i> (on page 308).  For older databases (created before version 06.00.22xx), run this custom command to update the database; then exit the application. Delete the old session file and open with a new session file. The new colors are available.  New databases (created after version 06.00.22xx) automatically use the corrected colors.
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<b>Custom Command</b>	<b>Place Piles</b>
<b>ProgID</b>	PileFoundation,PileFoundation.PileFoundation
<b>Description</b>	Provides a placement wizard to facilitate the modeling of pile members. Through the <b>Place Piles</b> command, you can specify the number of piles in each direction as well as edge clearances and depth dimensions. You can also specify the member cross section and material for the piles.

<b>Custom Command</b>	<b>Placing Supports from XLS</b>
<b>ProgID</b>	PlacingSupportsFromXLS,PlacingSupportsFromXLS.PlacingSupportsFromXLS
<b>Description</b>	Places support information from an .xls file into Smart 3D. You must run this command from Smart 3D, and not from Project Management. For more information, see <i>Placing Supports from XLS Command</i> in the <i>Smart 3D Hangers and Supports User's Guide</i> .

<b>Custom Command</b>	<b>Remove Design Basis</b>
<b>ProgID</b>	IMSEngFrameworkCmd.RemoveDsgnBasis
<b>Description</b>	Removes all correlation relationships and then deletes all design basis objects in the 3D model.  This command is useful when you want to register to a different SmartPlant foundation database.  After running this command, you must register the model, retrieve information, and correlate the objects again.  You must run this command from a task in the model, and not from Project Management.

<b>Custom Command</b>	<b>Repair Documents</b>
<b>ProgID</b>	DwgRepairCmd.RepairDocuments
<b>Description</b>	Updates invalid Styles.sha or Symbol Browser file paths on a document or a set of documents. Invalid file paths can occur when you change the symbol share. This causes overhead while editing, saving, or updating documents.

<b>Custom Command</b>	<b>Repair Duplicate Permission Group ID</b>
<b>ProgID</b>	RepairDuplicatePermissionGrpID,Ingr.SP3D.ProjectMgmt.Client.Commands. RepairDuplicatePermissionGrpIDCommand
<b>Description</b>	<p>Lists all catalogs and models that have a duplicate permission group ID.</p> <p>Select the catalogs and models to repair. You cannot select all of the databases under a particular duplicate permission group ID.</p> <p>This command can only be invoked from Project Management.</p> <p>This command cannot be run from a satellite location. You should run this command only from the host location.</p>

<b>Custom Command</b>	<b>Repair Permission Groups</b>
<b>ProgID</b>	PermissionGroupsAndLocations,Ingr.SP3D.ProjectMgmt.Client.Commands.PermissionGroupsAndLocationsCommand
<b>Description</b>	<p>Repairs the corrupted relationship between permission groups and the location for both catalog and model permission groups.</p> <p>If a permission group has lost the relationship with a location or has multiple relationships, then this command re-establishes a proper relation. This command cannot be run from a satellite location. You should run this command only from the host location.</p> <p><b>NOTE</b> Users with full permissions in the corrupted permission group can only re-establish the relationship.</p>

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<b>Custom Command</b>	<b>Repair Style Path</b>
<b>ProgID</b>	DwgRepairCmd.RepairDocuments
<b>Description</b>	Fixes Symbol and Style paths on RAD documents.

<b>Custom Command</b>	<b>Synchronize Drawing Component Templates</b>
<b>ProgID</b>	DwgSynchTemplatesCmd.SynchTemplates
<b>Description</b>	Repairs a drawing component that has become corrupted by synchronizing it with a different, uncorrupted drawing component. This command requires that the source component is the same type as the corrupted component, and that the source component cannot be corrupted. Also, the number of views on the source component must be the same as the number of views on the corrupted component. The names of the views on the source component must match the view names of the corrupted component.

<b>Custom Command</b>	<b>Synchronize Drawing Templates</b>
<b>ProgID</b>	DwgSynchTemplatesCmd.SynchTemplates
<b>Description</b>	Synchronizes, or copies, a template from one drawing component to another.

<b>Custom Command</b>	<b>Verify P&amp;ID Integrity</b>
<b>ProgID</b>	SP3DDisplayPIDService.VerifyPIDCmd
<b>Description</b>	Validates the internal connections between objects on a P&ID and objects in the model database. This command is useful when there is a problem displaying a P&ID or selecting objects on a P&ID. The command provides some basic troubleshooting statistics: number of design basis objects, number of 3D objects (correlated), number of P&ID objects, number of deleted P&ID OIDs, and number of duplicate OIDs.
<b>Custom Command</b>	<b>Profile Auto Bound</b>
<b>ProgID</b>	mhprofileautobound.AutoBoundProfile

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<b>Description</b>	Creates mutual bounding between stiffeners profiles or profile edge reinforcements present on the chute plates. The command requires that the chute plates be mutually bounded to each other and that the distance between the stiffener\edge reinforcement is between 0 to 0.01m.
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<b>Custom Command</b>	<b>Audit Tool</b>
<b>ProgID</b>	stAnalysisTool.AuditTool
<b>Description</b>	Compares two databases using an SQL query. The databases can be on different servers and have different catalog schema. Changed objects can be displayed in the workspace of the current model. This command is useful after performing a migration, synchronization, or hull swap.

<b>Custom Command</b>	<b>GC Menu</b>
<b>ProgID</b>	GCMenu.Activate
<b>Description</b>	Places the <b>GC</b> menu on the software toolbar. This menu contains commands for creating geometric constructions, GC sets, and GC macros. For more information, see <i>Geometric Construction Macros (GC Menu)</i> in the <i>Molded Forms User's Guide</i> .

<b>Custom Command</b>	<b>Verify Seam Pattern to Split</b>
<b>ProgID</b>	SplitCommands.VerifySeamPatternToSplit
<b>Description</b>	Checks the status of seams and plates split by the seams. This command provides a count of successful and failed splits, and modified, new, identical, and deleted leaf systems. You can also display the objects affected by the seams by selecting one or more of the following options: <b>Identical Bodies (Green)</b> , <b>Modified Bodies (Yellow)</b> , <b>New Bodies (Red)</b> , <b>Deleted Bodies (White)</b> , or <b>Bad Splitters (Blue)</b> . This command is useful when swapping an old imported hull system with a new hull. For more information, see <i>Swap Hulls on a Detailed Model Using Molded Forms Delay</i> in the <i>Molded Forms User's Guide</i> .

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### What do you want to do?

- *Create custom commands* (on page 469)
- *Add custom commands* (on page 469)
- *Run a custom command* (on page 469)
- *Edit a custom command* (on page 470)
- *Delete a custom command* (on page 470)

## Create custom commands

1. Open Microsoft® Visual Basic.
2. In Visual Basic, click **Add-Ins > Command Wizard**.
3. Complete all steps on each page of the **Command Wizard**.

### † TIPS

- You do not create custom commands within the software. You create them in Visual Basic using the **Command Wizard**.
- You must install the **Command Wizard** software in Visual Basic. The setup for the **Command Wizard** (SP3DCommandWizardV2.exe) is located in the *[Product Folder]\Programming\Tools\CommandWizard* folder.

## Add custom commands

1. Click **Tools > Custom Commands**.
2. On the **Custom Commands** dialog box, click **Add**.
3. On the **Add Custom Command** dialog box, type the program identifier you assigned to the command in Microsoft® Visual Basic in the **Command ProgID** box.
4. Type the name you assigned to the command in the **Command name** box.
5. Type a phrase that describes the command in the **Description** box.
6. If necessary, change the option in the **Priority** section.
7. Type command line arguments in a string in the **Argument** box.

† TIP After you complete this procedure, the **Custom Commands** dialog box lists the command you added to the software. You can run the command, edit the settings, or delete the command.

## Run a custom command

1. Click **Tools > Custom Commands**.  
The **Custom Commands** dialog box opens.

2. To start a custom command you created, select the command in the list box, and click **Run**.
3. After the command runs, click **Close** on the **Custom Commands** dialog box.

## Edit a custom command

1. Click **Tools > Custom Commands**.

*The **Custom Commands** dialog box opens.*

2. To change the options for a custom command, select the command in the list box, and click **Edit**. For example, you can change the name and description of the command.
3. After completing the needed changes, click **Close** on the **Custom Commands** dialog box.

**NOTE** You must open the command in Microsoft® Visual Basic if you want to edit the underlying code.

## Delete a custom command

1. Click **Tools > Custom Commands**.

*The **Custom Commands** dialog box opens.*

2. Select the command in the list box, and click **Delete**. The software removes the command from the list box; however, the command code is not deleted.
3. After completing the needed changes, click **Close** on the **Custom Commands** dialog box.

**NOTE** This action does not delete the DLL for the custom command. It just removes access to the custom command from the user interface.

### See Also

*Custom Commands Dialog Box* (on page 470)  
*Add Custom Command Dialog Box* (on page 471)  
*Edit Custom Command Dialog Box* (on page 471)

## Custom Commands Dialog Box

Adds and edits customized commands you have created with the **Command Wizard** in Microsoft® Visual Basic. For information on creating custom commands, see *Create custom commands* (on page 469).

### Command names

Lists the names of commands that have been added.

### Run

Starts the custom command you select in the list box. For more information, see *Run a custom command* (on page 469).

### Close

Cancels the **Custom Commands** dialog box.

### Edit

Opens the **Edit Custom Command** dialog box. You can change settings for the command, such as the program identifier (prog\_ID) and command name. For more information, see

*Edit a custom command* (on page 470).

**Add**

Installs the custom command into the software. For more information, see *Add custom commands* (on page 469).

**Delete**

Removes the custom command from the software. For more information, see *Delete a custom command* (on page 470).

**Clear**

Deletes the information you have typed in the boxes on the **Custom Commands** dialog box.

**Description**

Contains an identifying phrase so you can better recognize the custom command with which you are working

## **Add Custom Command Dialog Box**

Accesses a customized command you created in Microsoft® Visual Basic and saves the command within the software.

**Command ProgID**

Identifies the program identifier for the custom command you created in Visual Basic.

**Command name**

Specifies the name you assigned to the custom command.

**Description**

Describes the custom command.

**Priority**

Assigns a priority of **High**, **Normal**, or **Low**.

**Argument**

Specifies command line arguments in a string.

## **Edit Custom Command Dialog Box**

Changes options for a customized command you added to the software.

**Command ProgID**

Specifies the program identifier for the custom command you created in Microsoft® Visual Basic.

**Command name**

Provides a text box for you to change the name you assigned to the custom command.

**Description**

Provides a text box to provide a descriptive phrase for the custom command.

**Priority**

Changes priority to **High**, **Normal**, or **Low**.

**Argument**

Change the command line arguments in a string.

**Reset Default**

Returns the dialog box to its default settings.

## Utility

Provides specialized utility and maintenance commands. To access the commands, select **Tools > Utilities**, and then click the needed command.

## Synchronize Workspace with Catalog

Updates selected items in the Model database with all changes from the Catalog database, including property, specification, and symbol changes. Synchronizing only selected objects in the model, greatly reduces the amount of time it takes to synchronize the model with the catalog. You access the command by selecting **Tools > Utilities > Synchronize Workspace with Catalog**.

The **Synchronize Workspace with Catalog** command updates selected objects in the following states:

- The model object is out-of-date on the **To Do List**.
- The model object is in error on the **To Do List**.
- The model object is flagged with a warning on the **To Do List**.
- A related catalog object has been modified, and the model object is marked out-of-date by the **Mark out-of-date occurrences** option in the Project Management task.

For more information about out-of-date and in error objects, see *To Do List* (on page 252).

**NOTES**

- This command differs from the **Synchronize Model with Catalog** command in the Project Management task to synchronize all model objects with the current catalog database. For more information, see *Synchronize Model with Catalog Command* in the *Project Management User's Guide*.

---

**What do you want to do?**

- *Synchronize all objects in the workspace* (on page 473)
- *Synchronize selected objects* (on page 473)

---

## **Synchronize all objects in the workspace**

1. Click **Select** .
2. In a graphics view, click in an empty area so that no items are selected.
3. Select **Tools > Utilities > Synchronize Workspace with Catalog**.
4. In the **Synchronize Workspace with Catalog** dialog box, all items in the workspace that are out-of-date appear in the grid.
5. Click **Update**.

## **Synchronize selected objects**

1. Click **Select** .
2. In a graphics view or in the **Workspace Explorer**, select the model items to synchronize with the catalog.
3. Select **Tools > Utilities > Synchronize Workspace with Catalog**.
4. In the **Synchronize Workspace with Catalog** dialog box, the selected items that are out-of-date appear in the grid.
5. Click **Update**.

### **NOTES**

- Select **Show objects with To Do Records** to also display items on the **To Do List** that are also out-of-date.
- Select an item in the grid to highlight it in the graphic views and the **Workspace Explorer**.
- Fields selected in the grid can be copied.
- To stop the synchronization process, click **Cancel**. Processing ends after synchronization of the current item is complete.
- When processing is complete, a summary of the results is displayed. The summary shows the number of successful and failed updates. You can also choose to display a log file containing more details.

## **Synchronize Workspace with Catalog Dialog Box**

Displays out-of-date items with their properties and status.

### **Out of date objects in workspace**

Displays selected objects that are out of date in the grid.

### **Object ID**

Displays the OID, or internal identifier for the item. This column is hidden by default. Resize the header columns to display the **Object ID** column.

### **Name**

Displays the name of the item, as shown in the **Workspace Explorer**.

**Catalog Item Type**

Displays the item type, as specified in the catalog.

**Catalog Item Name**

Displays the name of the related item in the catalog. The out-of-date item is synchronized to the catalog item.

**Modified by**

Displays the user who last modified the item.

**Date Modified**

Displays the date on which the item was last modified.

**Status**

Status of the synchronize process.

**Update**

Click to start the synchronize process on items in the grid.

**Stop**

Stops the synchronize process and close the dialog box.

**Total Items**

Displays the total number of out-of-date items.

**Update Succeeded**

Displays the number of successfully updated items.

**Update did not succeed**

Displays the number of unsuccessfully updated items.

**Status bar**

Displays the progress of the update process.

**See Also**

[To Do List \(on page 252\)](#)

[Synchronize All Objects in the Workspace \(on page 473\)](#)

[Synchronize Selected Objects \(on page 473\)](#)

## Review MDR Results

The Model Data Reuse operation is performed in Project Management. After the operation completes, you can use this utility to review additional information about the transaction.

To access this utility, click **Tools > Utilities > Review MDR Results** in the Smart 3D graphical environment.

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**What do you want to do?**

- [Create an MDR Results Report \(on page 475\)](#)
- [Filter MDR Results \(on page 475\)](#)

---

## Create an MDR Results Report

1. Open the log file that you want to use from the Smart 3D graphical environment by clicking **Tools > Utilities > Review MDR Results**.
2. Click the **Report** button to view the MDR results in an Excel spreadsheet report.
3. Click **Filter** to create a select set of objects to view in the **Review MDR Results** dialog box.
4. Click **Report** again to view this select set in an Excel spreadsheet report.

## Filter MDR Results

1. In the Smart 3D graphical environment, click **Tools > Utilities > Review MDR Results**.
2. Click **Filter** on the **Review MDR Results** dialog box.
3. Set your filter options.  
*Filter MDR Results Dialog Box (on page 476)*
4. Click OK, and view the results of the filtering process in the same dialog box.

## Review MDR Results Dialog Box

Open this dialog box by clicking **Tools > Utilities > Review MDR Results** on the toolbar in the Smart 3D graphical environment.

### Model Data Reuse log file

Shows the location of the log file.

### Browse button

Locates the log file generated by the Model Data Reuse Wizard. The log file may be located at %temp% or any shared location.

### Report

Creates a report in Microsoft® Excel about the items copied during an MDR operation.

### Filter

Filters out the objects or classes that you do not want to appear in the report; that is, the filter lets you select the items you want to see in the report.

### << First

Moves to first page.

### < Previous

Moves to previously viewed page.

### Next >

Moves to next page.

### Last >>

Moves to last page.

**Add to Select Set**

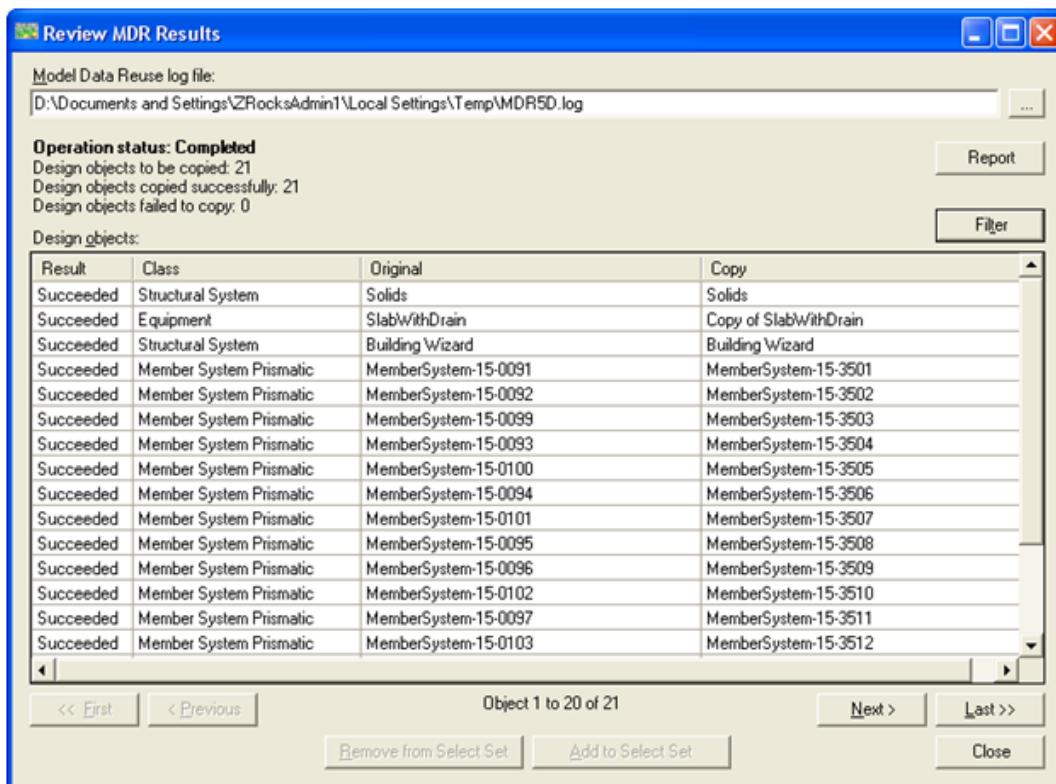
Creates a Select Set as you click an object or objects in either the **Original** or **Copy** column. After selecting the objects, click **Add to Select Set**. Use the select set to manipulate those objects in the Smart 3D graphical view.

**Remove from Select Set**

Removes objects that makeup the select set (**original** or **copy**). Click anywhere in the graphical view to clear the select set.

**Close**

Exits the dialog box.

**Filter MDR Results Dialog Box**

Use the **Filter MDR Results** dialog box to filter out the objects you do not want included in the MDR Results Report.

**Design objects successfully copied**

Shows the design objects that successfully copied.

**Design objects that failed to copy**

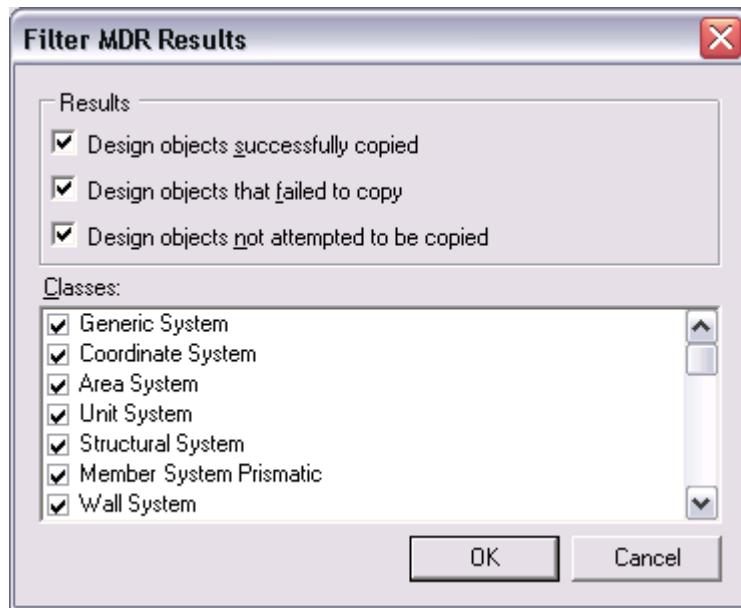
Shows the design objects that failed to copy.

**Design objects not attempted to be copied**

Shows the design objects the software did not attempt to copy.

## Classes

Shows the results and the classes included or excluded in the MDR Results Report. Check the ones to include and remove the check from those you want to exclude.



## See Also

[Filter MDR Results \(on page 475\)](#)

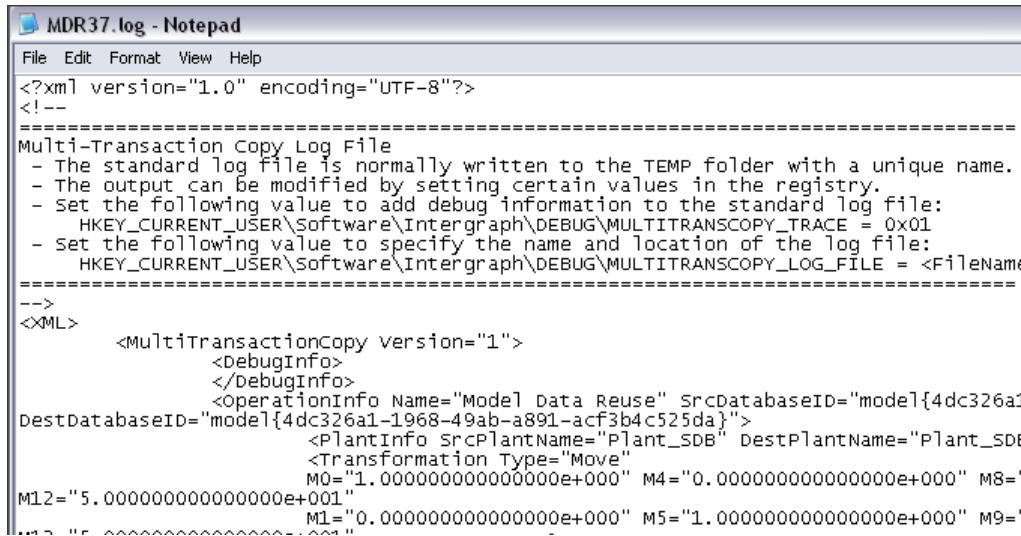
[Create an MDR Results Report \(on page 475\)](#)

## View the MDR Log File

The **Model Data Reuse** (MDR) command generates a log file for each MDR operation. This log file contains information about each design object that was part of the operation. For the objects that were successfully copied, the original object ID (OID) and the copy OID are shown in the log. For the objects that failed to copy, only the original OID displays.

Use **Windows Explorer** or another browser to locate the MDR log file, which is stored at %temp%. The name of the log file is MDR[file\_number].log where file\_number is replaced by a

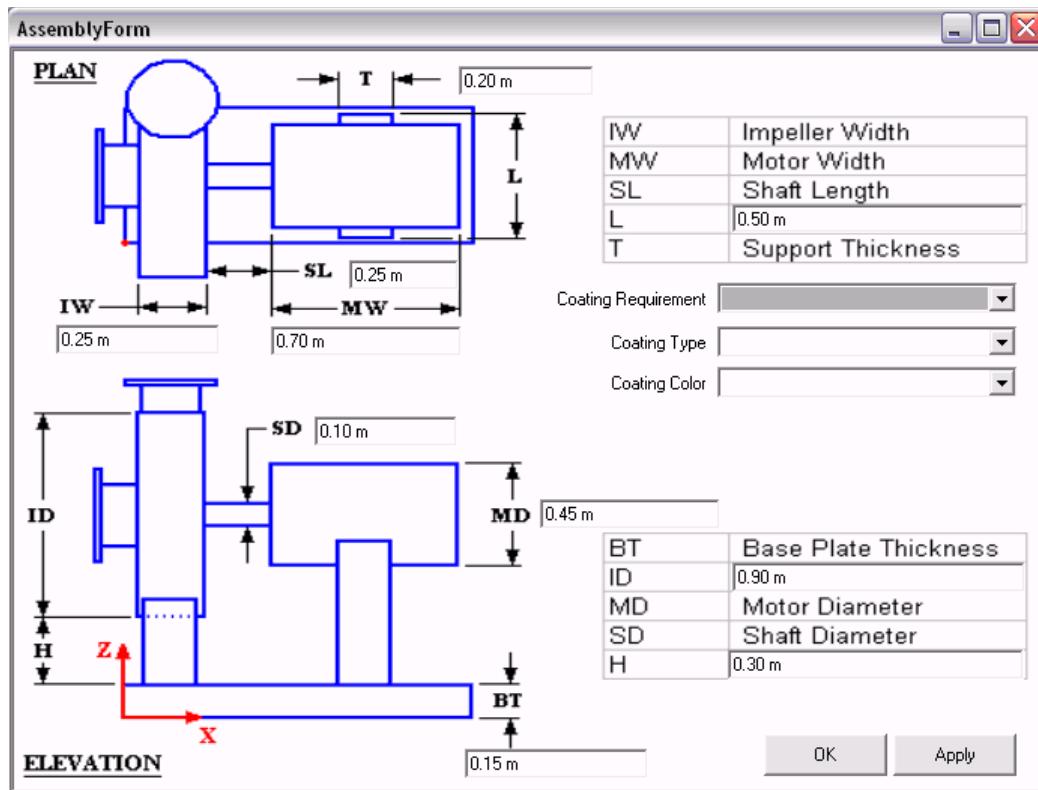
number to make it unique. The text file appears similarly to the one shown in the following illustration.



```

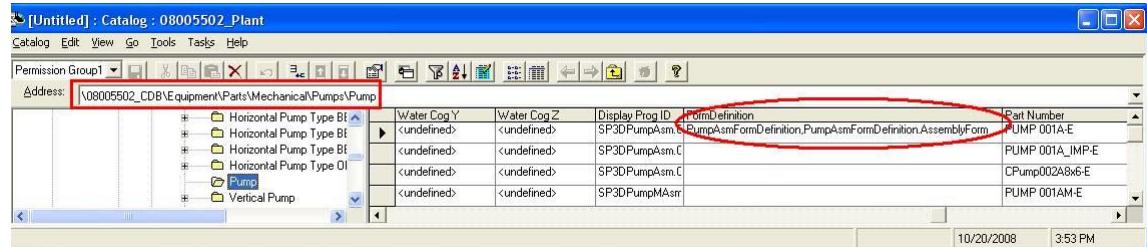
MDR37.log - Notepad
File Edit Format View Help
<?xml version="1.0" encoding="UTF-8"?>
<!--
=====
Multi-Transaction Copy Log File
- The standard log file is normally written to the TEMP folder with a unique name.
- The output can be modified by setting certain values in the registry.
- Set the following value to add debug information to the standard log file:
  HKEY_CURRENT_USER\Software\Intergraph\DEBUG\MULTITRANSOPY_TRACE = 0x01
- Set the following value to specify the name and location of the log file:
  HKEY_CURRENT_USER\Software\Intergraph\DEBUG\MULTITRANSOPY_LOG_FILE = <FileName>
-->
<XML>
    <MultiTransactionCopy version="1">
        <DebugInfo>
        </DebugInfo>
        <OperationInfo Name="Model Data Reuse" SrcDatabaseID="model{4dc326a1"
DestDatabaseID="model{4dc326a1-1968-49ab-a891-acf3b4c525da}">
            <PlantInfo SrcPlantName="Plant_SDB" DestPlantName="Plant_SDE"
            <Transformation Type="Move"
              M0="1.000000000000000e+000" M4="0.000000000000000e+000" M8='
M12="5.000000000000000e+001"
              M1="0.000000000000000e+000" M5="1.000000000000000e+000" M9='
              M7="0.000000000000000e+000" M3="0.000000000000000e+000" M6='
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```

An example of a completed form is shown in the graphic below.



### After Defining the Form

- Place the form's .dll file in the \$Symbols\bin folder.
- For example, key in <>AssemblyName,NameSpaceName.ClassName>> to the **FormDefinition** column of Equipment part in the Catalog task.



### Opening the User-defined Form

The **Custom Form Definition** command automatically displays when you place the object for which a form definition exists. After placing the object, click **Custom Form Definition** to

open the form. It is enabled only if a proper form definition is defined for that particular object. For the remaining objects, it is disabled.

### ! TIPS

- Save your first project as a template for all other user-defined forms. You can make changes on this project for other symbols instead of creating the form from scratch each time.
- Properties such as Name, Weight and CG, Surface Treatment, and so forth, are common for most of the symbols. Therefore, these properties need not be modified each time.
- You can make minor changes on the form for similar symbols. For example, in Equipment and Furnishings task, the delivered pumps **Horiz Centrifugal Pump With Flush and Drain Nozzles** and **Horiz Centrifugal Pump With StructureSteel or Polyshield Base** are similar equipment but have different symbols. They may have common properties like **MotorLength**, **CouplingLength**, and so forth. Therefore, the same form can be used for both.
- If there is some similarity between equipment, for example, **Complex Horizontal Cylindrical Vessel** and **Storage Tank**, you can keep the common properties like **Vessel Diameter** and **Vessel Length**, and modify, add, and remove the remaining properties, including the background of the form.
- You can modify the form by changing the interface name and the property name on the **Properties** window of the user control in .NET.

---

### What do you want to do?

- *Create a user-defined form in Visual Studio* (on page 480)
- *Check Validation* (on page 492)
- *Create Multiple or Nested Forms* (on page 496)
- *Create a user-defined form using Form Definition Wizard* (on page 500)

---

## **Create a user-defined form in Visual Studio**

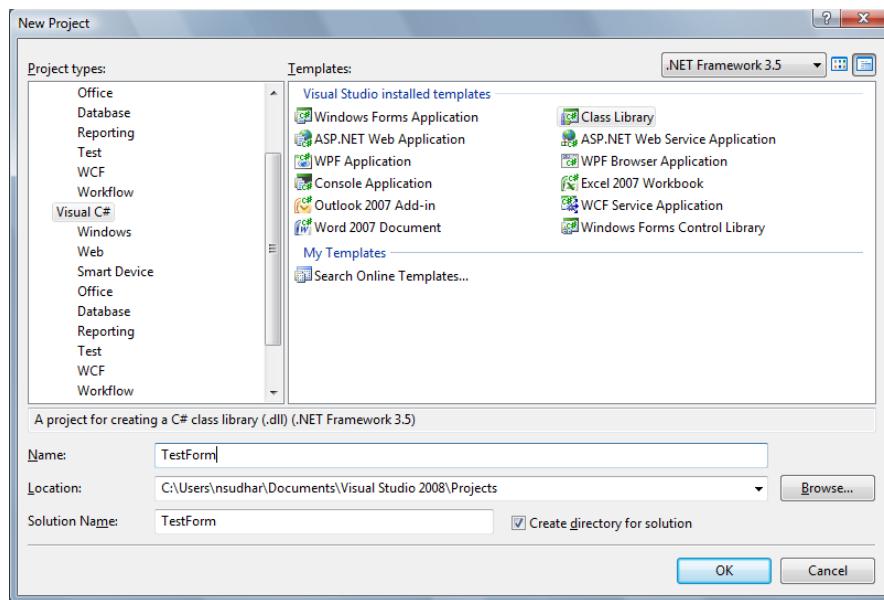
To create a user-defined form in Microsoft Visual Studio, use the following procedures:

1. *Create the project* (on page 480).
2. *Add references to the project* (on page 482).
3. *Add New Windows Form* (on page 486).
4. *Design the Symbol Background* (on page 487).
5. *Add user controls to the Toolbox* (on page 488).
6. *Place a control on the form* (on page 490).

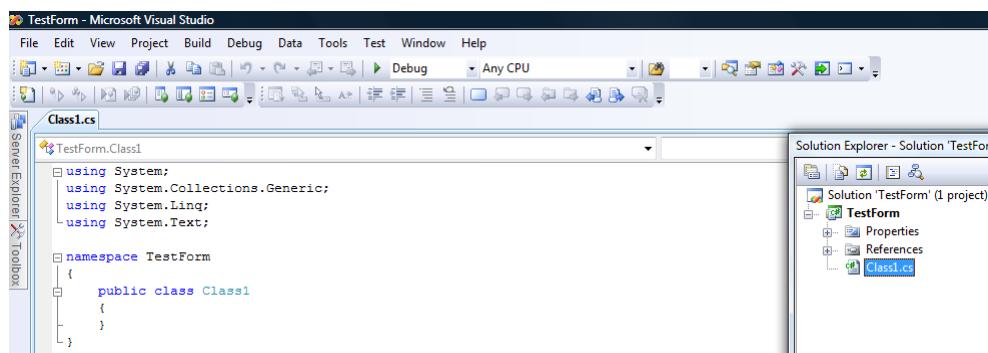
### **Create the Project**

1. Open Microsoft Visual Studio, and click **File > New > Project**.

2. In the **New Project** window, select **Class Library** and type a name for the project.

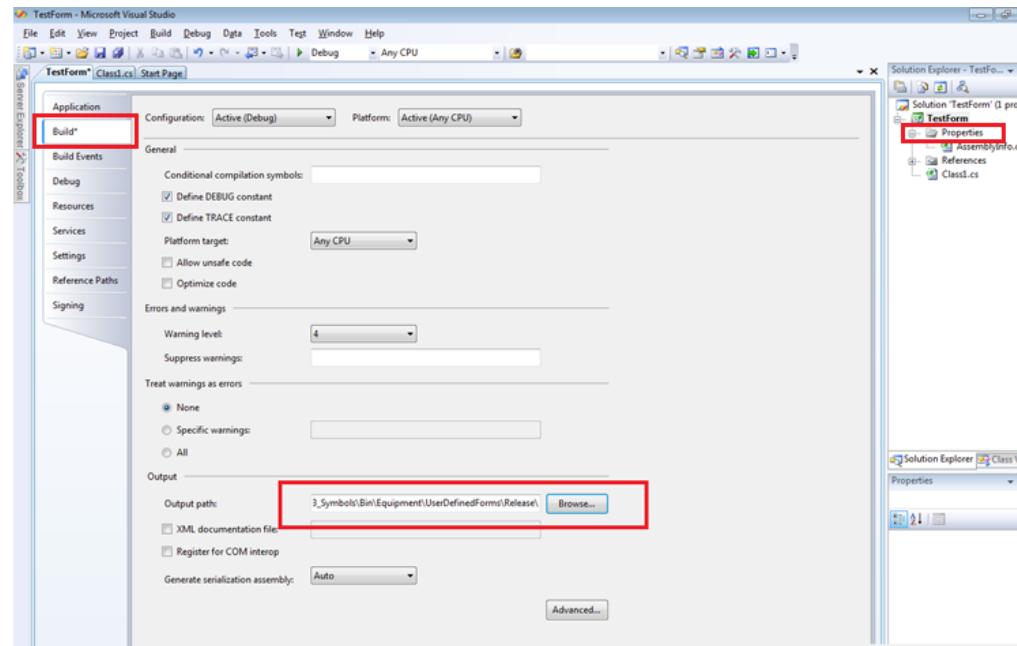


*A new tab opens for the new class file.*



3. In the **Solution Explorer**, right-click **Properties** under the new form you created.
4. On the **Properties** window, select **Build**.

- To change the output path, click **Browse**. For example, to create user defined equipment forms, change the output path to **\$Symbols\bin\Equipment\UserDefinedForms\Release**.

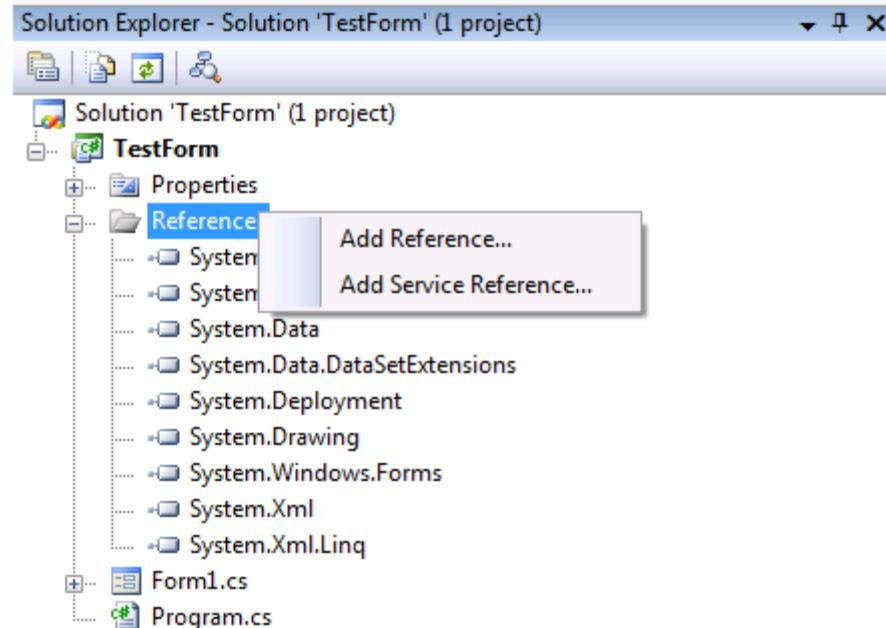


- Click **Save**, and close the **Properties** window.

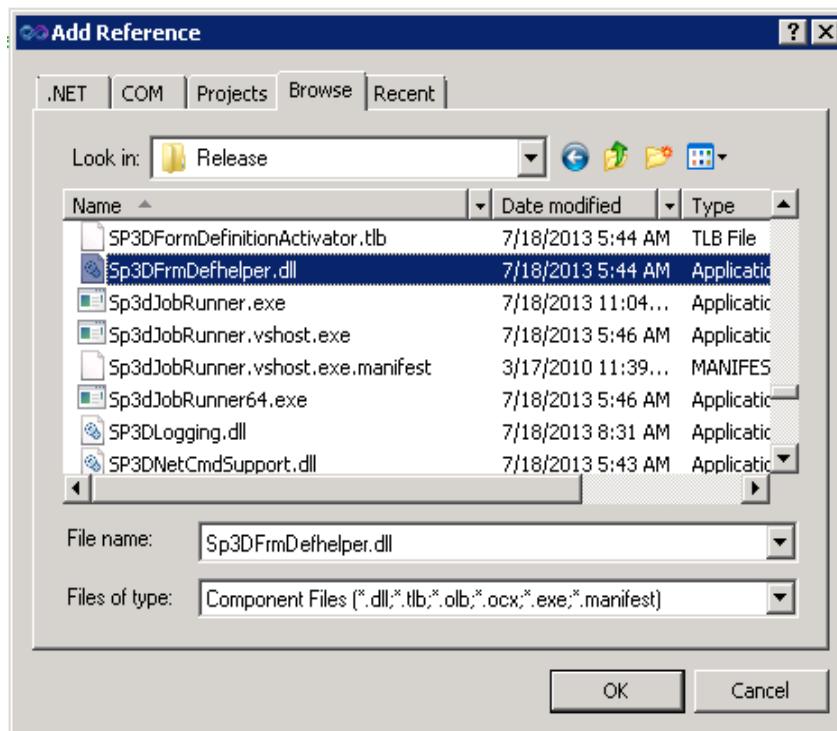
### Add References to the Project

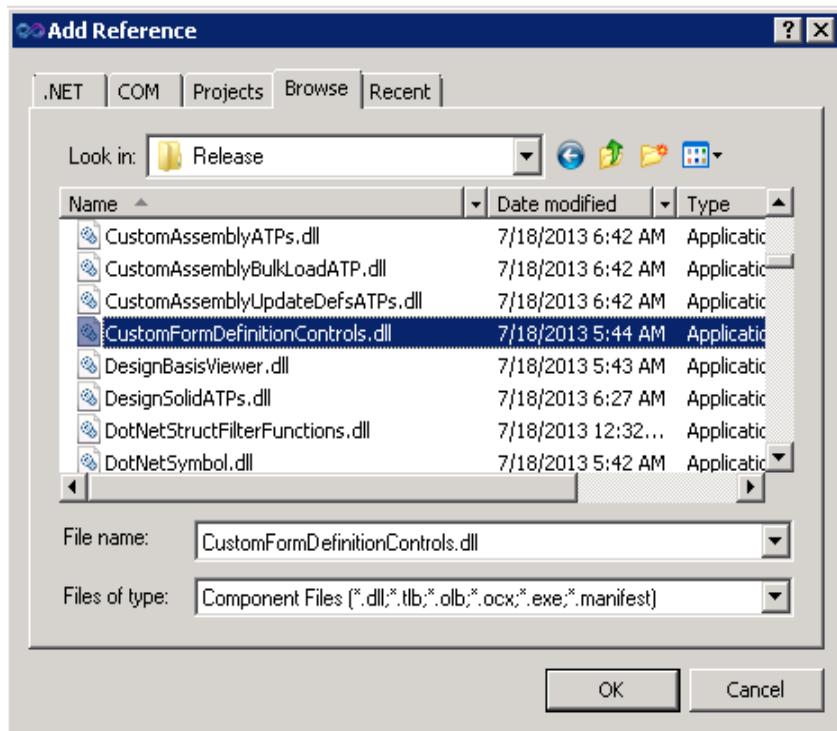
- In the **Solution Explorer**, right-click **References**, and click Add Reference.

*Add Reference dialog box appears.*



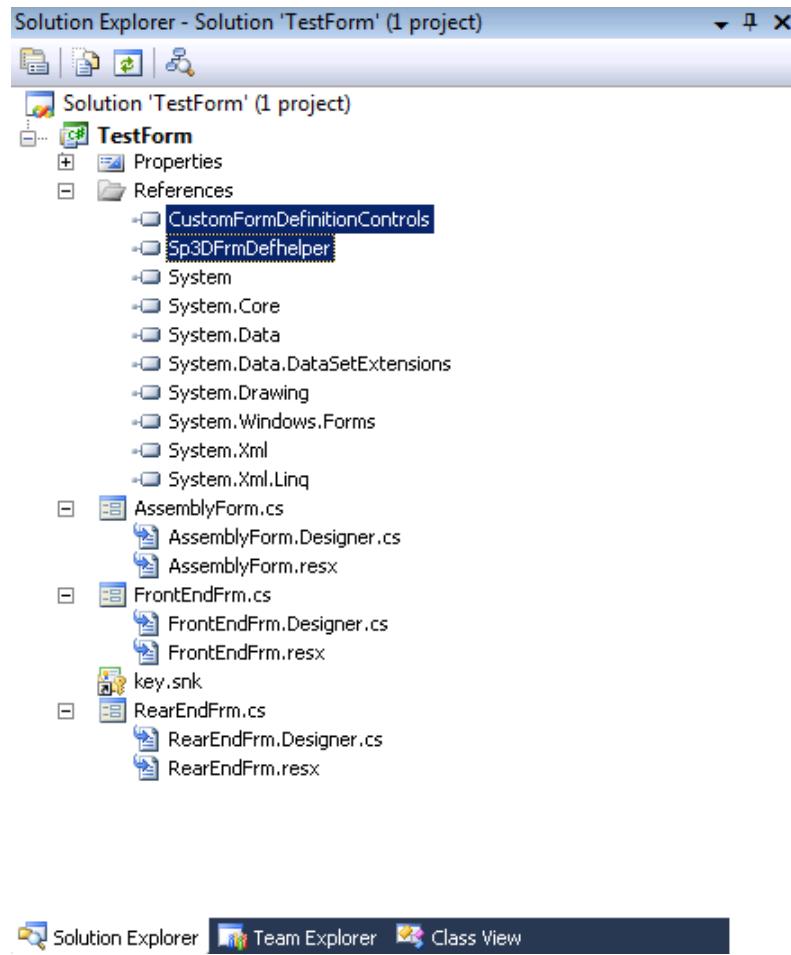
2. Click on **Browse** tab.
3. Browse to [*Product Folder*]Core\Container\Bin\Assemblies\Release folder, and select the following references.
  - Sp3DFrmDefhelper.dll
  - CustomFormDefinitionControls.dll





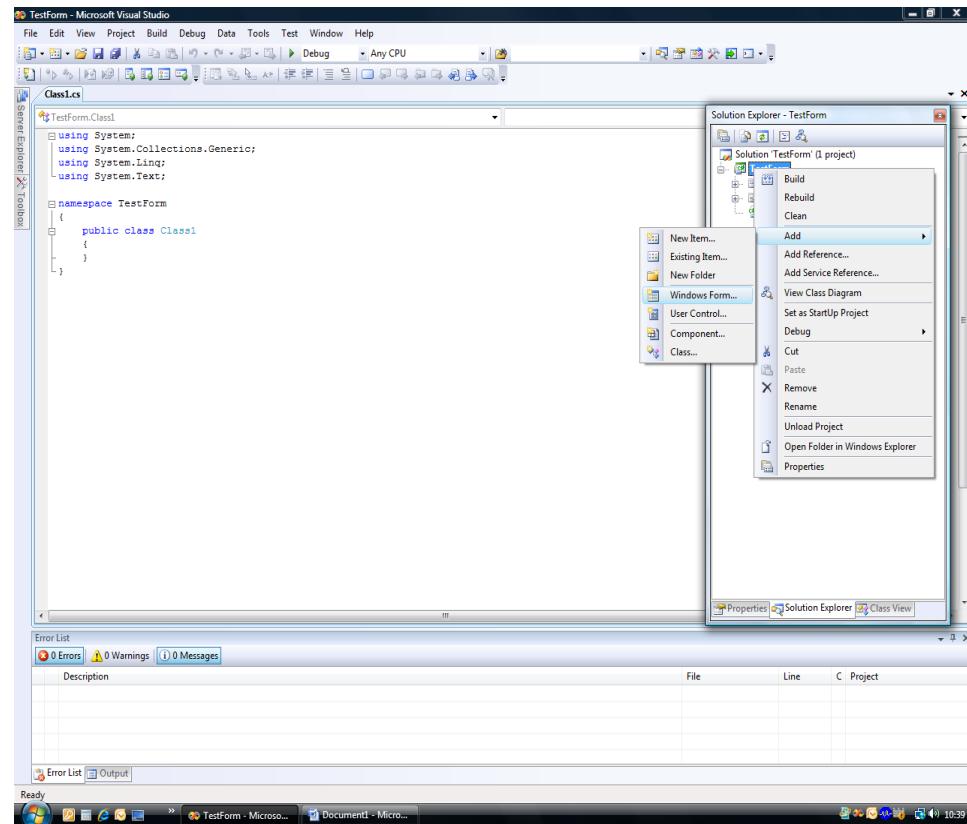
4. Click **OK**.

The selected references are appended to the list of existing references.

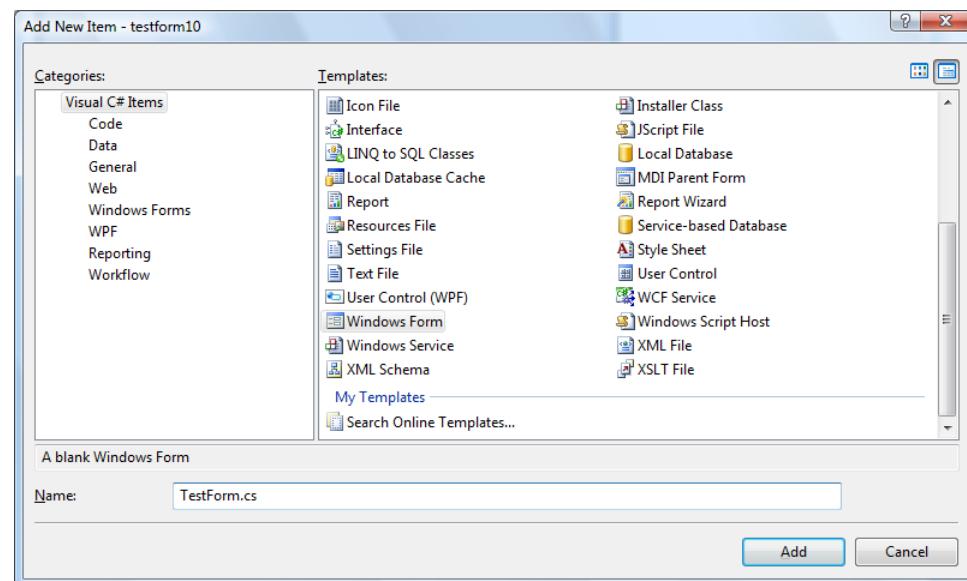


## Add New Windows Form

1. In the **Solution Explorer**, right-click **TestForm**, and click **Add > Windows Form**.



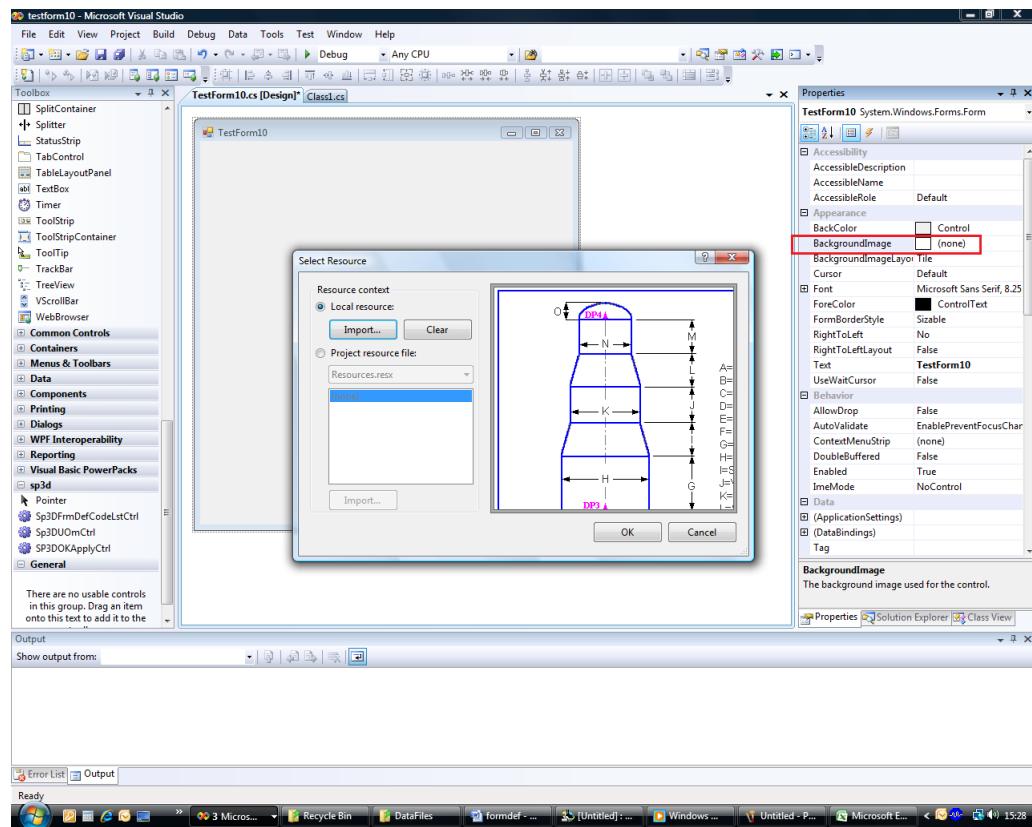
2. In the **Name** box, type **TestForm.cs**, and click **Add**.



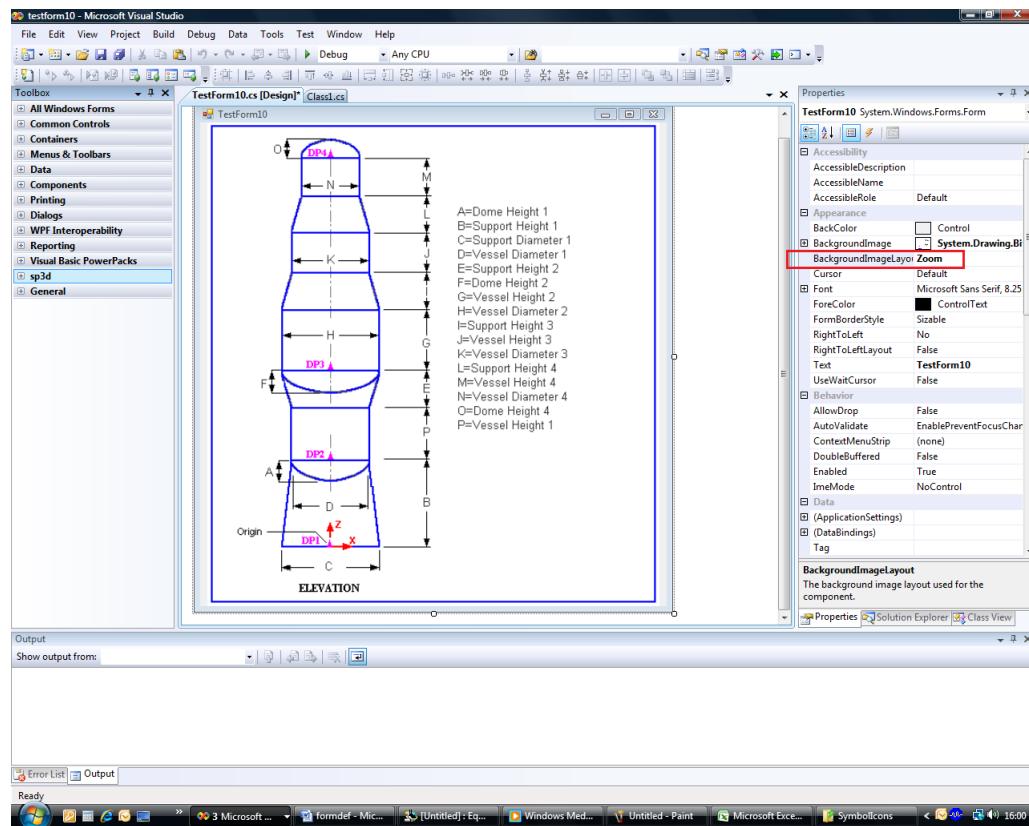
## Design the Symbol Background

1. Invoke **TestForm.cs** from **Solution Explorer**.
2. On the **Properties** window, set the background image to **SP3DComplexVesselAsm.gif**.

**NOTE** This file should be available at **\$Symbols\SymbolIcons\**.



3. Set **BackgroundImageLayout** to ensure the correct settings.



### Add User Controls to the Toolbox

1. Right-click the **Toolbox** window on the left side, and select **Add Tab**.
2. Type a name for the new toolbox. For example, type **SP3D Controls**.
3. Right-click the **SP3D Controls** tab, and click **Choose Items**.

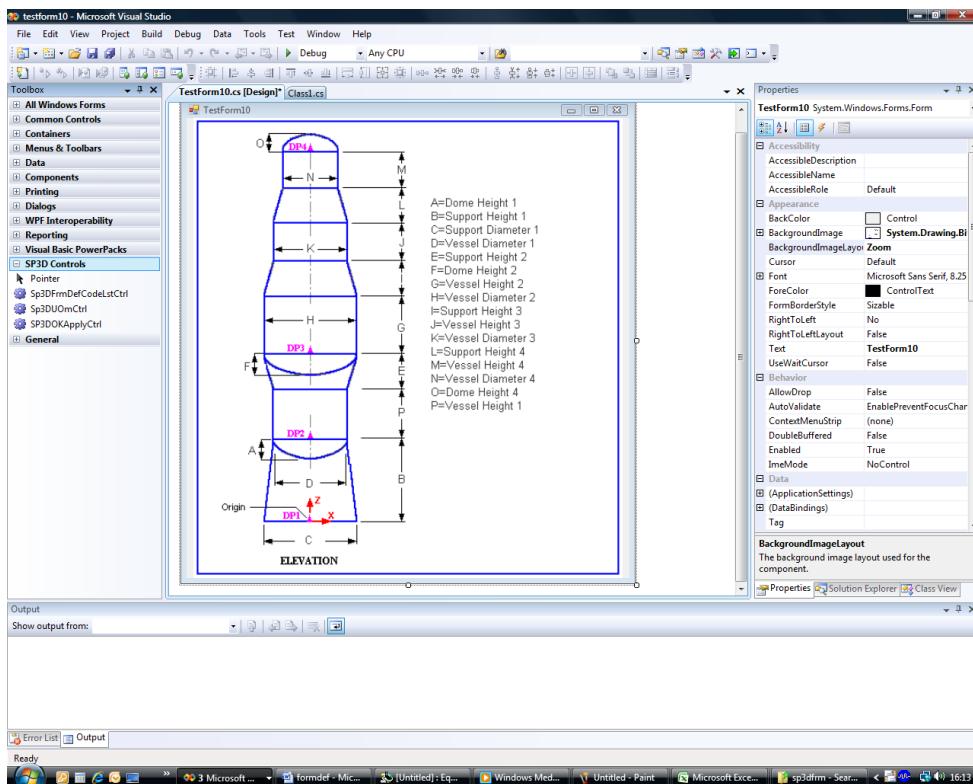
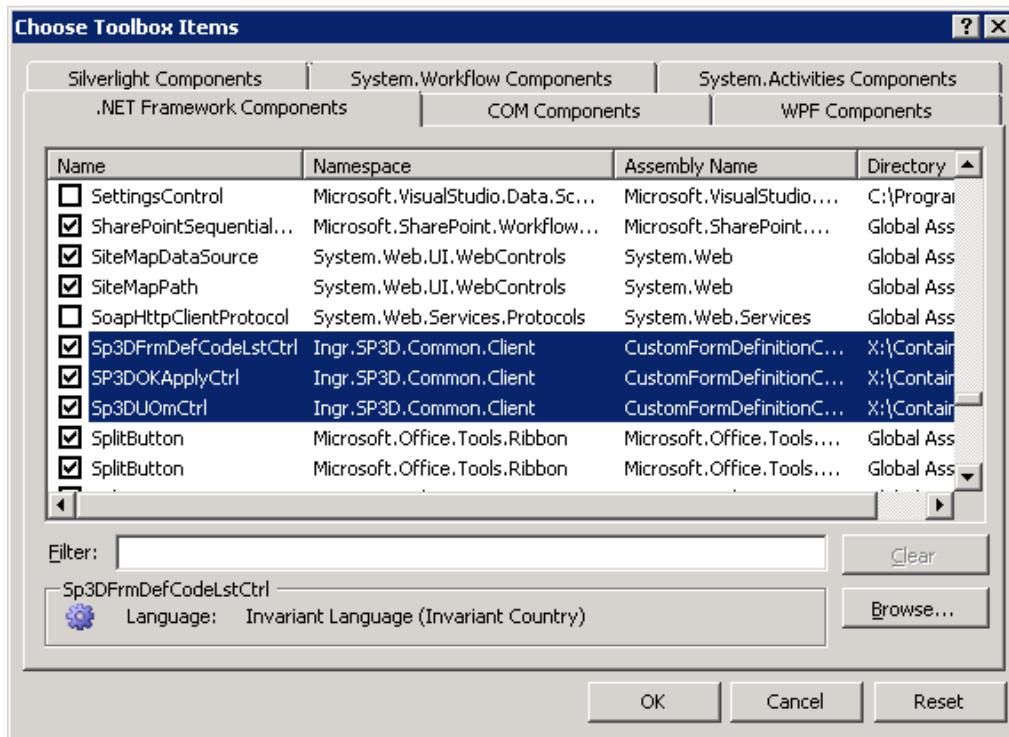
*The Choose Toolbox Items dialog box opens.*

4. Click **Browse**.

*The Open dialog box opens.*

5. Select *CustomFormDefinitionControls.dll* from the *[Product Folder]\Core\Container\Bin\Assemblies\Release* folder.
6. Select the following **.NET Framework Components**:
  - SP3DFrmDefCodeLstCtrl
  - SP3DOKApplyCtrl

- SP3DUOmCtrl



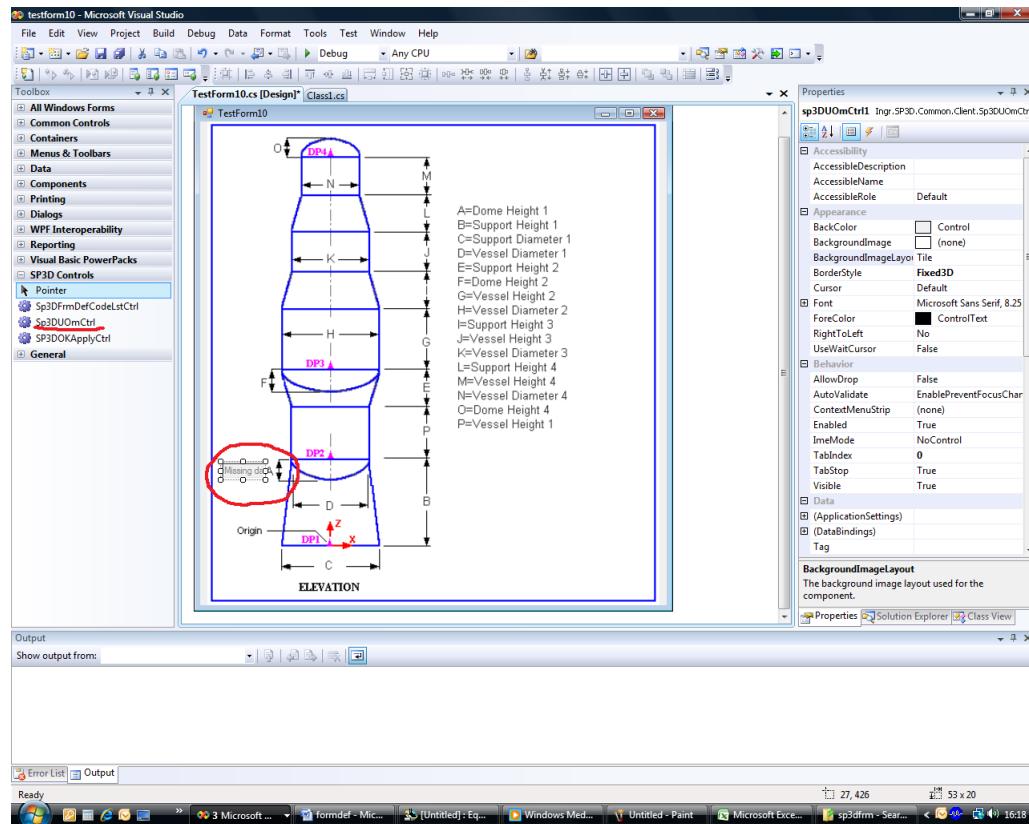
7. Click **OK**.

The user controls are added to the **SP3D Controls** tab of the **Toolbox**.

### Place a Control on the Form

1. In **TestForm.cs**, select **SP3DUOmCtrl** and try to place the control on the form near 'A'.

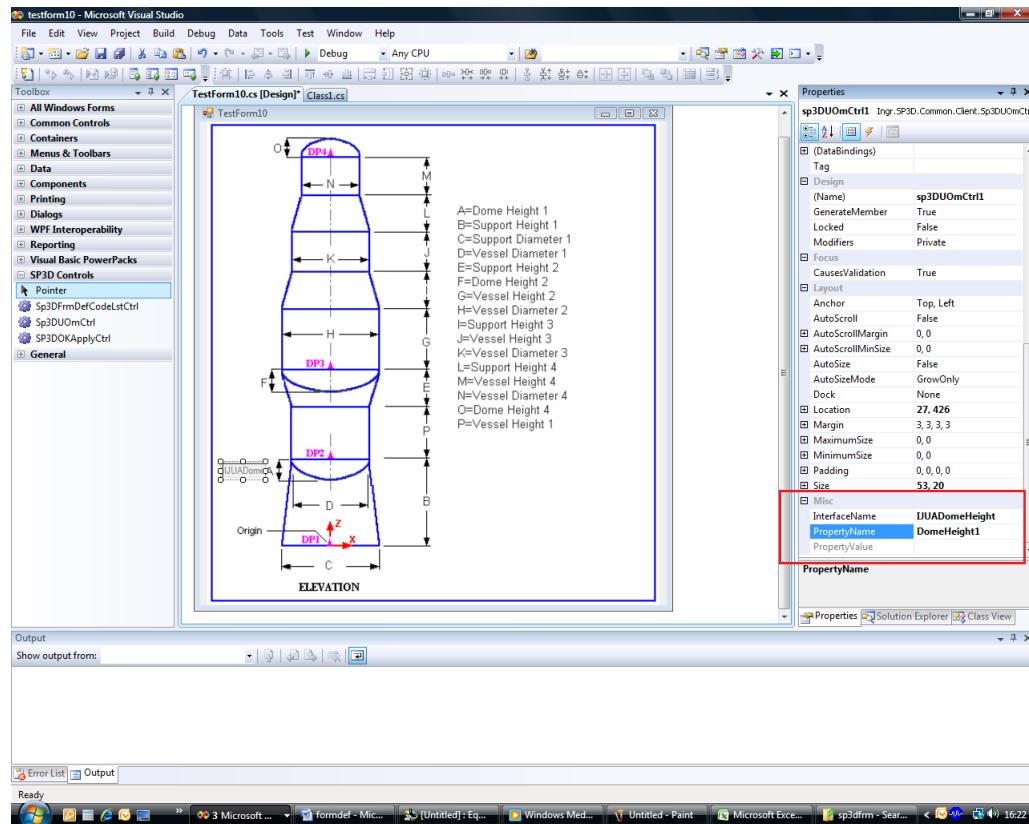
**NOTE** To place the control, drag the mouse on the form as if drawing a rectangle in Microsoft Paint.

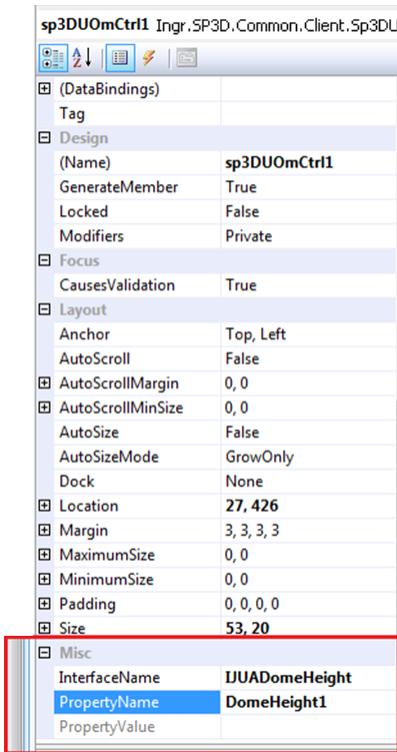


2. Go to the **Properties** window of the control placed in Step 1, and fill in the **InterfaceName** and **PropertyName** values under **Misc**. Similarly, place the user controls at all the required locations on the form.

**NOTE** The **InterfaceName** and **PropertyName** for each of the properties are found on the delivered spreadsheet: *[Product Folder]\CatalogData\BulkLoad\DataFilesEquipment.xls* or from the metadata browser. For example, in this step the property at control 'A' is 'Dome

Height 1'. Equipment.xls provides you with the **InterfaceName** and the **PropertyName(AttributeName)** on the **Custom Interface** sheet.

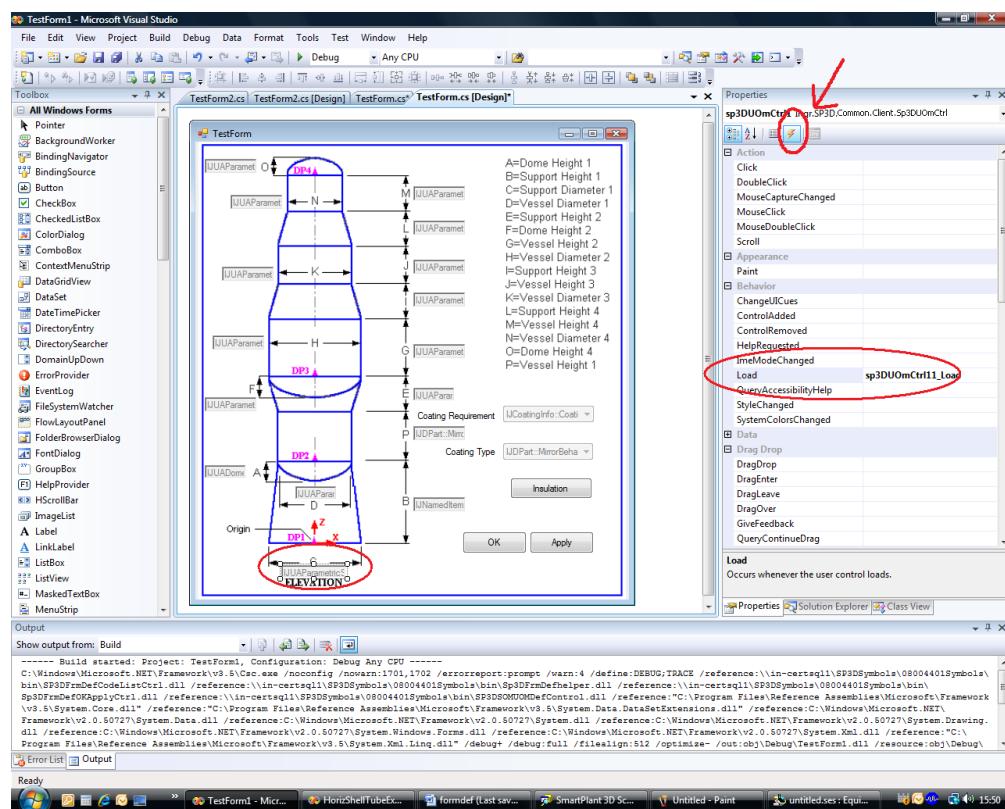




## Check Validation

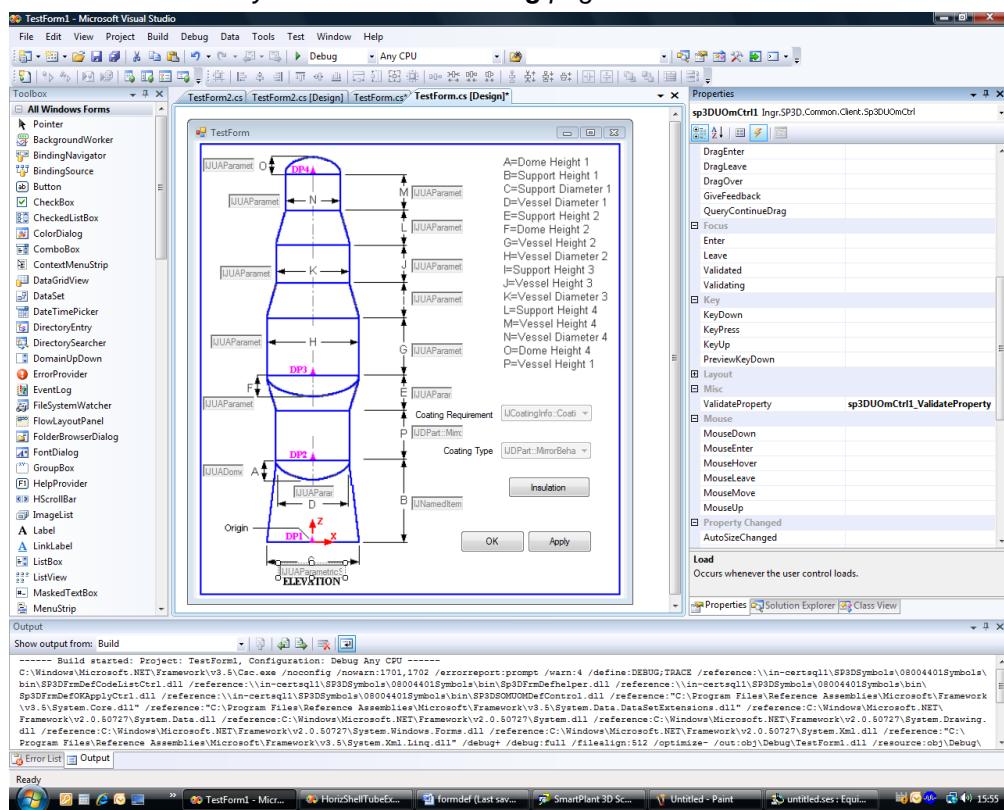
1. Select the control at 'C', and open the **Events** window.
2. On the **Events** window, type the value for **Load** as **sp3DUOmCtrl11\_Load**. You can select this value from the drop-down list.

**NOTE** Check the name of the control, and type the values accordingly. In this case, the control at 'C' is **sp3DUOmCtrl1**. Check the controls with your form, and type the values accordingly (sp3DUOmCtrlxxx).



- On the Events window, type the value for **ValidityProperty** as **sp3DUOmCtrl1\_ValidateProperty**, and press ENTER.

You are automatically directed to the **Coding** page.



- On the **Coding** page, type the following: `MessageBox.Show("Value acceptable");`

```

[TestForm2.cs] [TestForm2.cs [Design]] [TestForm.cs*] [TestForm.cs [Design]]
TestForm.TestForm
private void TestForm_Load(object sender, EventArgs e)
{
}

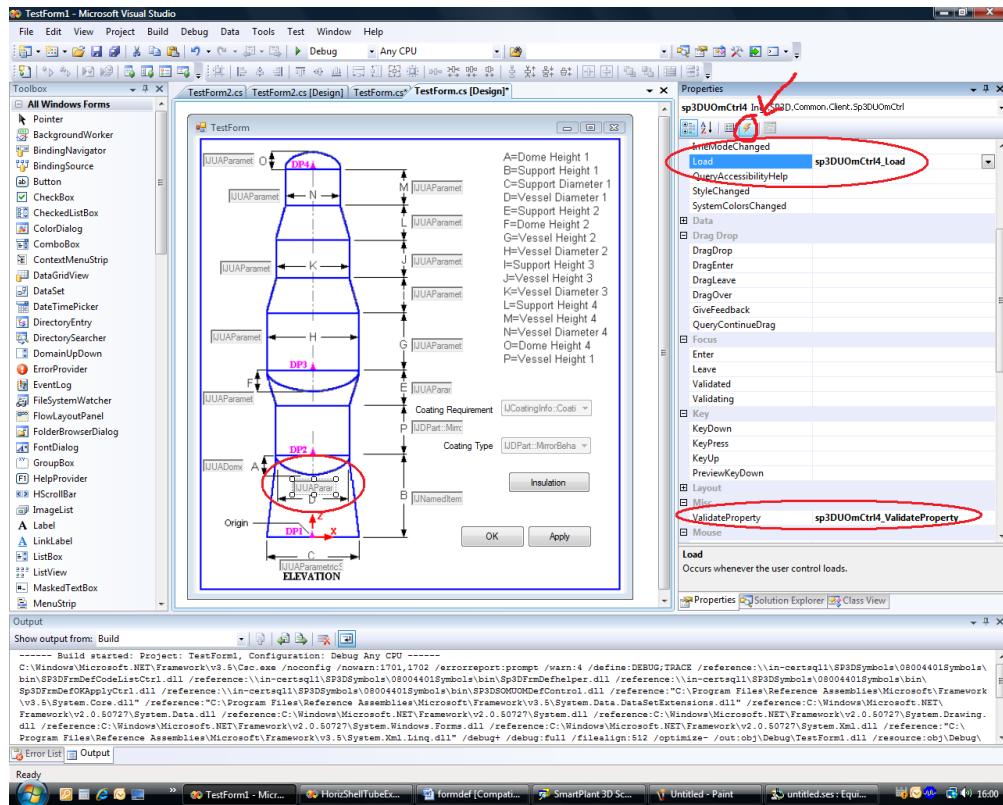
private void button1_Click(object sender, EventArgs e)
{
    TestForm1.TestForm2 oTestForm2 = null;
    oTestForm2 = new TestForm1.TestForm2();
    Form oFrm = (Form)oTestForm2;
    oFrm.ShowDialog();
}

private void sp3DUOmCtrl1_ValidateProperty(object sender, Ingr.SP3D.Common.Client.ValidatepropertyArgs e)
{
    MessageBox.Show("Value acceptable");
}

private void sp3DUOmCtrl4_Load(object sender, EventArgs e)
{
}

```

5. Similarly for the control at 'D', type the following code:



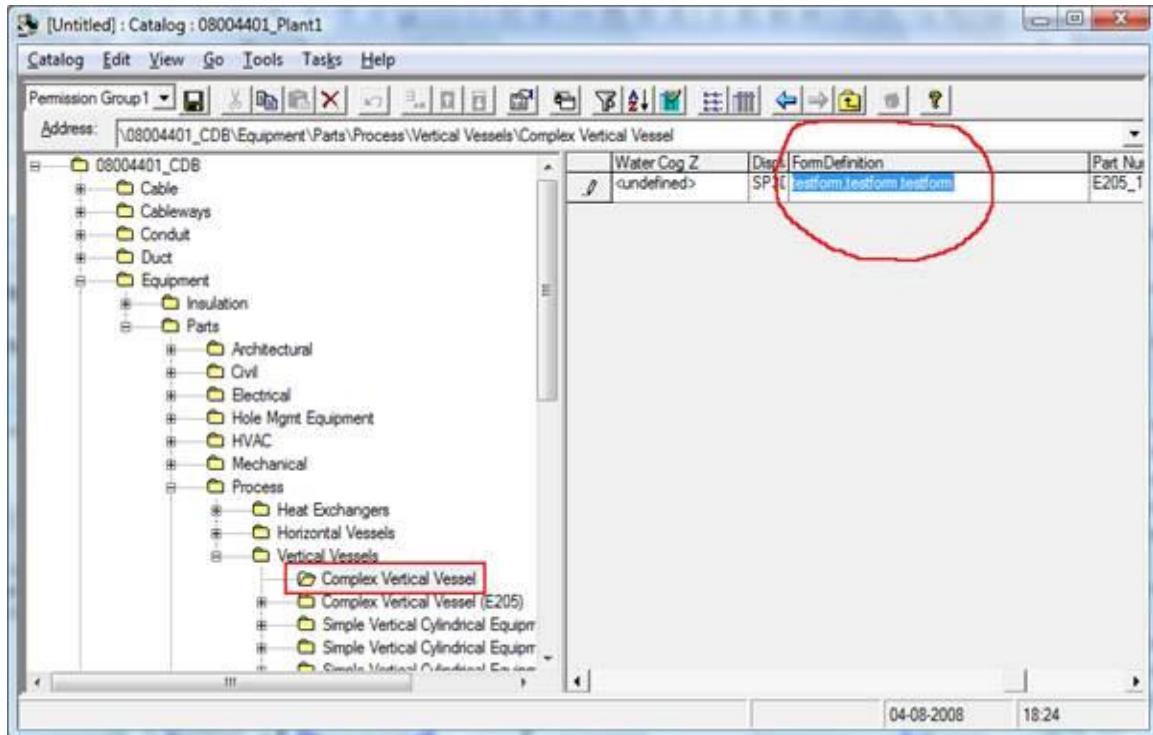
```

try
{
    UserControl oCntrl = (UserControl)sender;
    if (oCntrl != null)
    {
        double odblVal = System.Convert.ToDouble(e.NewPropertyValue);
        if (odblVal < 0.5)
        {
            MessageBox.Show("Value should be > 0.5");
            e.SuccessfullyValidated = false;
        }
        else
        {
            e.SuccessfullyValidated = true;
        }
    }
    catch (Exception)
    {
        e.SuccessfullyValidated = false;
    }
}

```

## Create Multiple or Nested Forms

When you do not have enough space to accommodate all of the properties on a single form, you can create a nested form; that is, a form that contains a similar set of properties and that can be used with other forms. For example, **Insulation** properties can be placed in a nested form, and you can invoke that form with a button click on the main form.



### See Also

[Create Multiple Forms \(on page 496\)](#)

### Create Multiple Forms

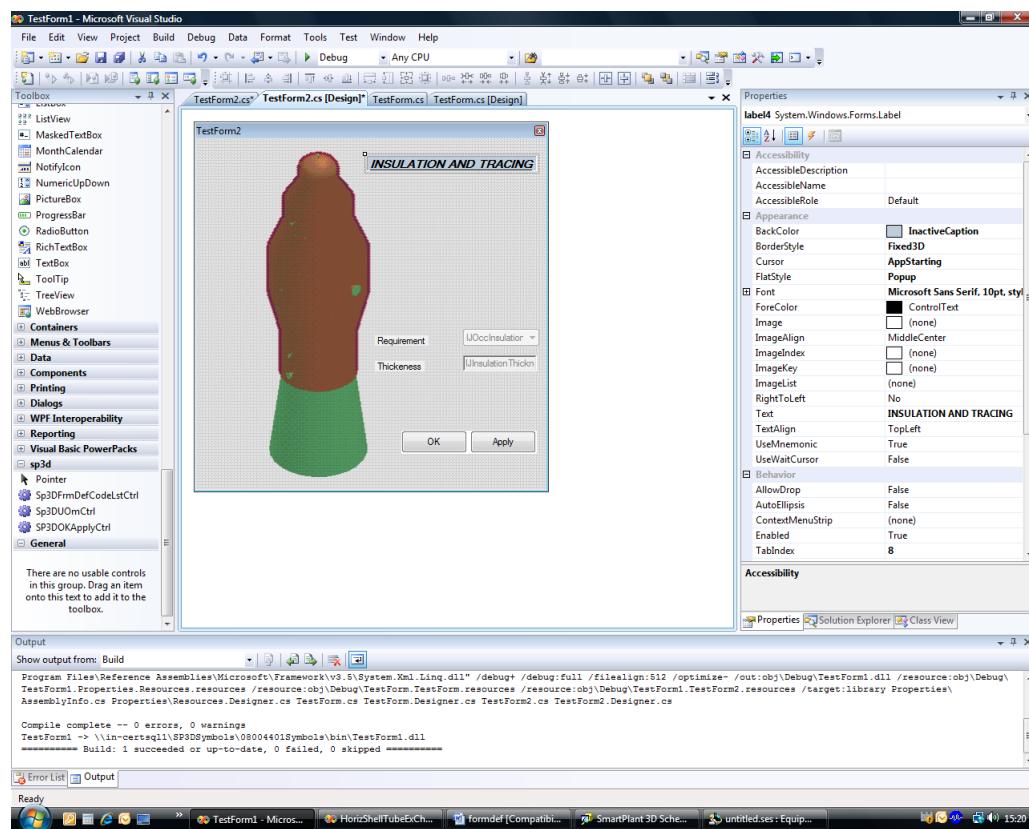
To create multiple forms, see the following example.

1. From **Solution Explorer**, right-click **TestForm**, add a new Windows form, and name it **TestForm2**.

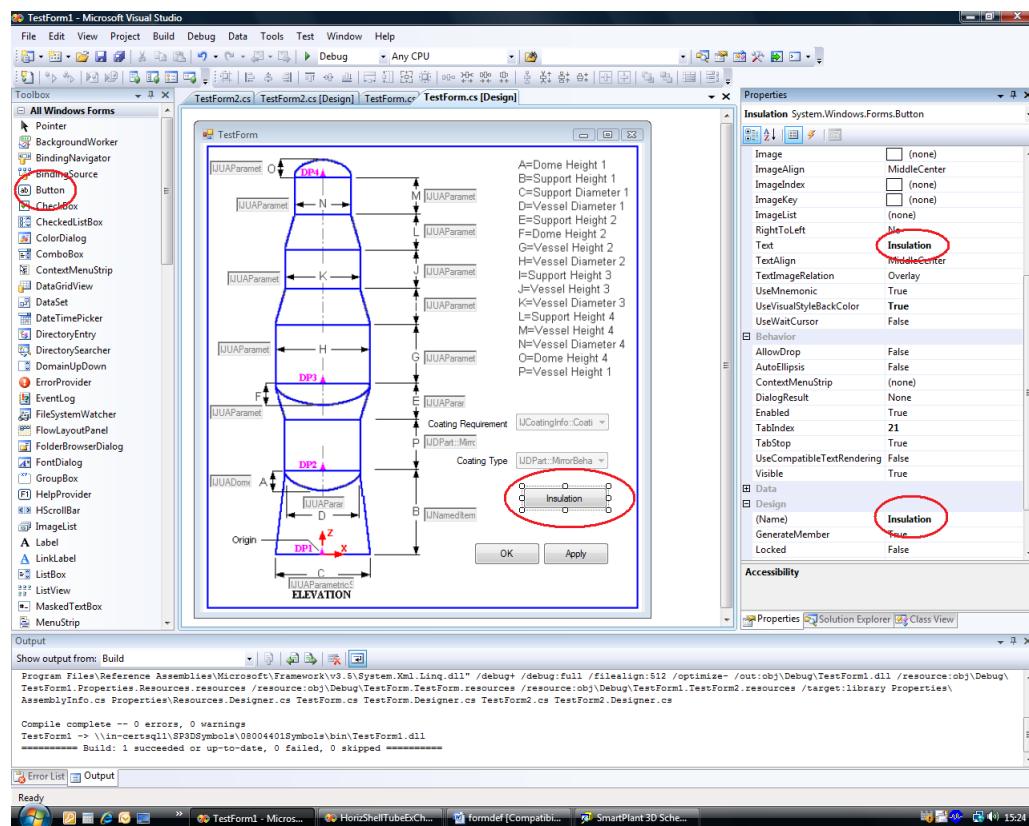
**NOTE** For information about adding a new windows form, see [Add New Windows Form \(on page 486\)](#).

2. Change the background of the form to any image, as shown in the following illustration, and add controls.

**NOTE** For more information, see *Design the Symbol Background* (on page 487) and *Place a Control on the Form* (on page 490).

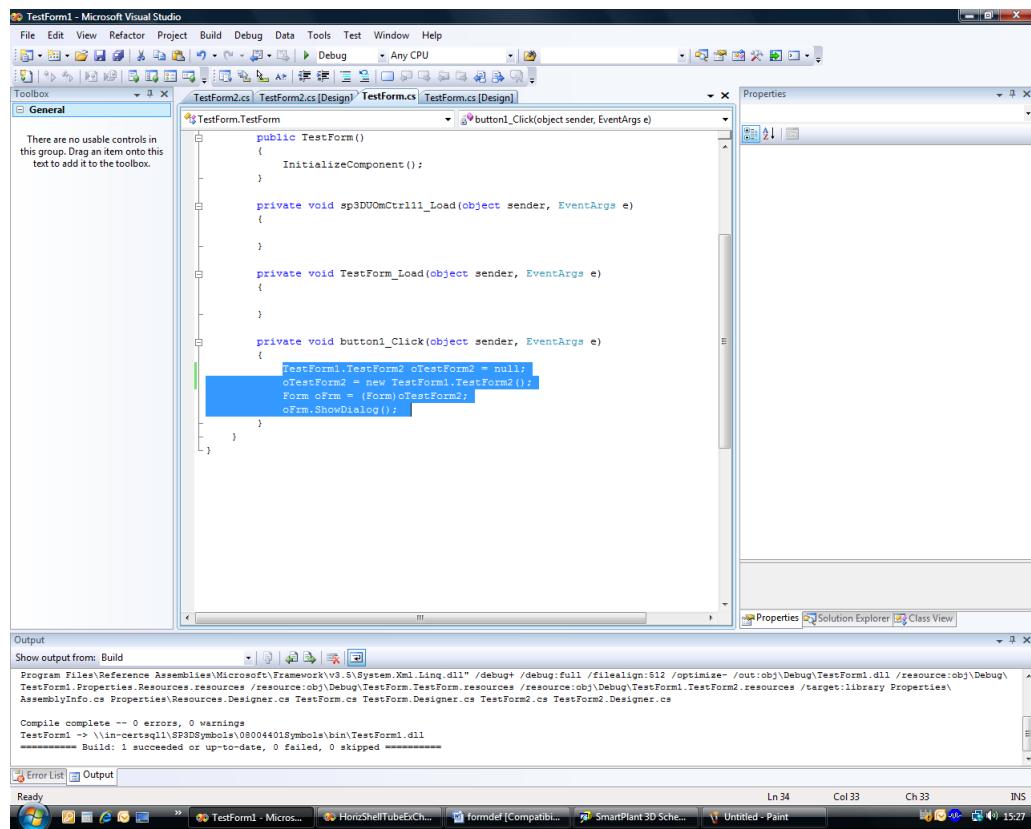


3. Go to the main **TestForm**, Add a Button, and rename the button as **Insulation**.

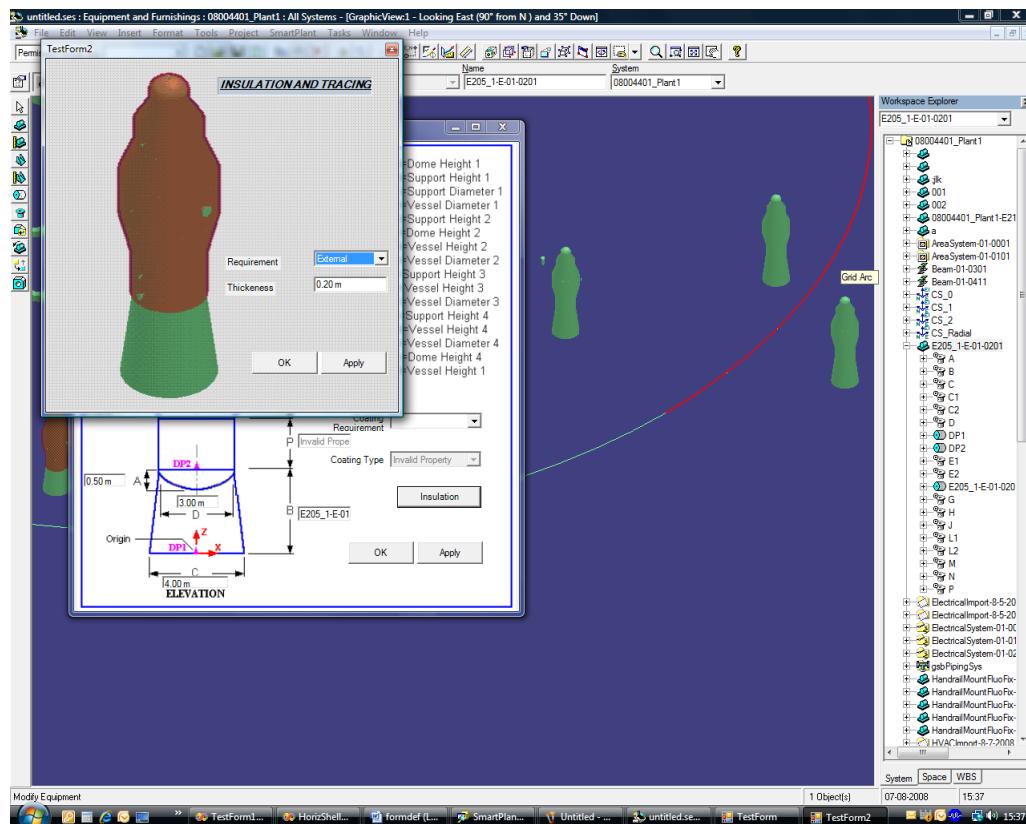


4. Double-click the button to be directed to the code page, and type the following text:

```
TestForm1.TestForm2 oTestForm2 = null;
oTestForm2 = new TestForm1.TestForm2();
Form oFrm = (Form)oTestForm2;
oFrm.ShowDialog();
```



5. Save and **Build** the solution.
6. Open Smart 3D, and go to Catalog task. Type '**TestForm,TestForm.TestForm**' on the **FormDefinition** column of the **Equipment** part in the Catalog task, as shown in the following example.



7. Go to the Equipment and Furnishings task, and place the vertical complex vessel.

*When placing the vessel, you can observe that the form appears.*

## Form Definition Wizard

You can create a new .Net project using the **Form Definition Wizard**.

### What do you want to do?

- *Create a user-defined form using Form Definition Wizard (on page 500)*

### Create a user-defined form using Form Definition Wizard

#### ★IMPORTANT

- Ensure that the System Variable **Path** in the Environment Variables dialog box contains **[Product Folder]\Smart3D\Core\Runtime**.
- Install the Programming Resources in the same location as the product.
- Install Microsoft Visual Studio 2010 or a higher version.

1. Right-click **FormDefWizard.exe** in the **[Product Folder]\Core\Container\Bin\Assemblies\Release** folder, and select **Run as administrator**.

*The **S3D Custom Form Definition Wizard** is displayed.*

2. Specify the form definition location details. See *S3D Custom Form Definition Wizard Dialog Box* (on page 502).

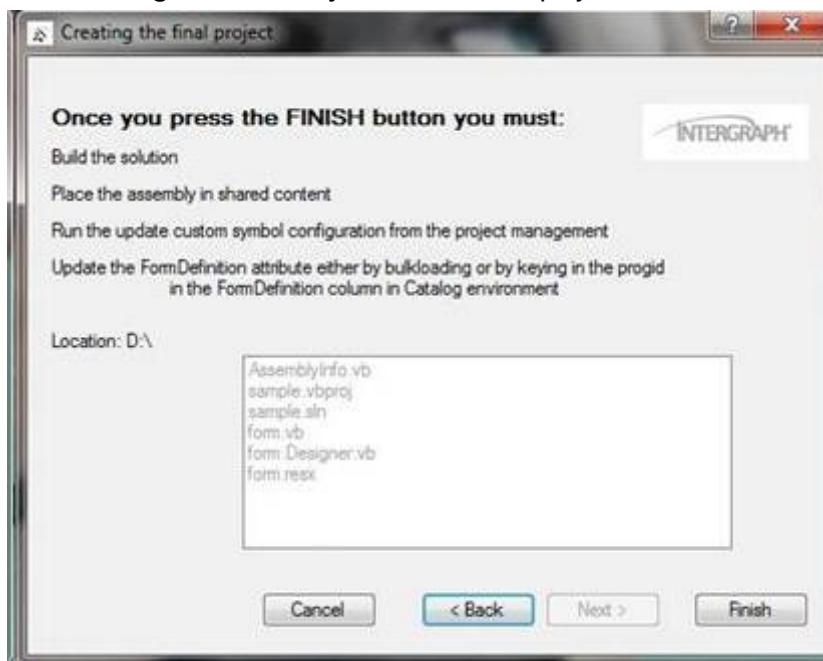
3. Click **Next**

*The **Properties on form Definition** window is displayed.*

4. Choose the part properties to be displayed on the form definition. See *Choose Part Properties Dialog Box* (on page 503).

5. Click **Next**.

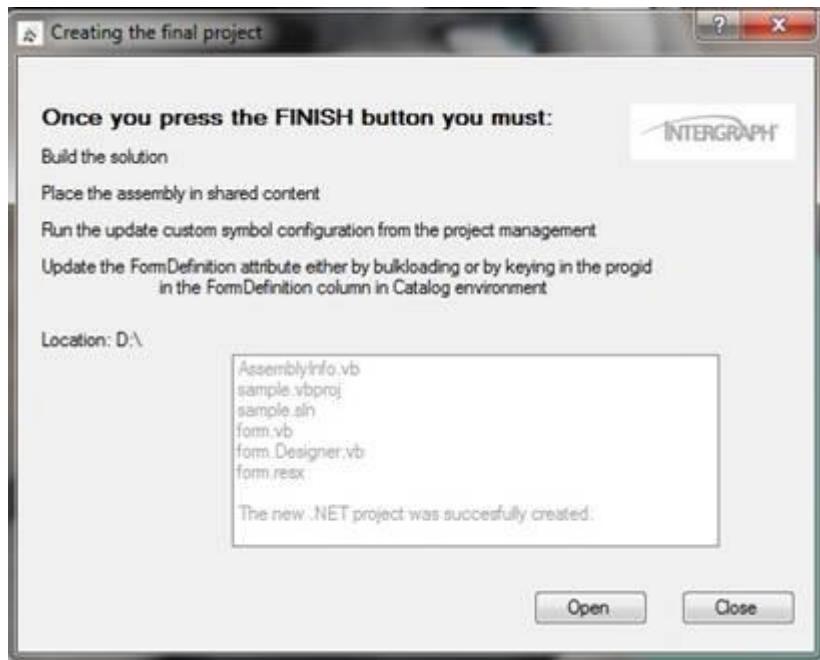
*The **Creating the final Project** window is displayed.*



This dialog box shows the steps to be performed after you click **Finish**. It also displays the new project location and a list of files that are created in the project.

6. Click **Finish**.

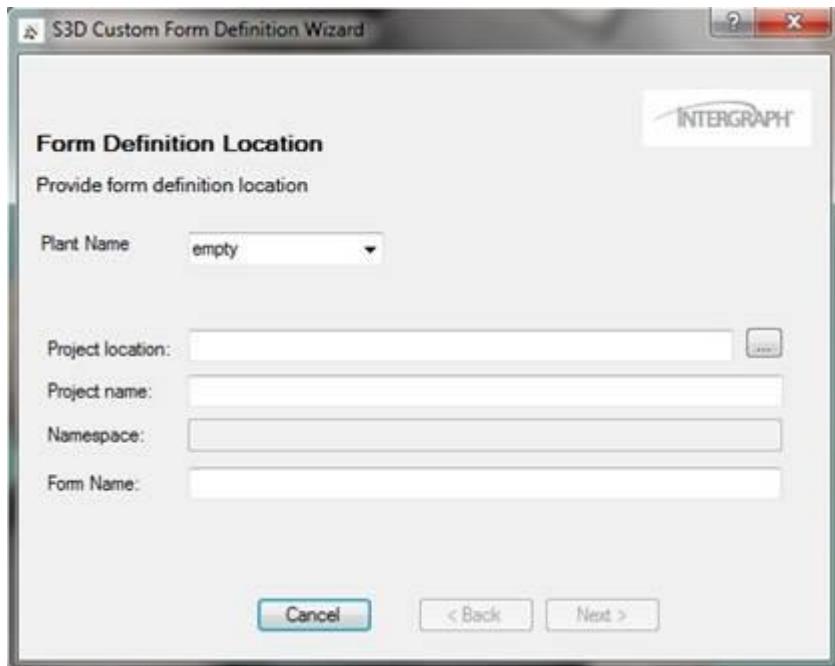
*The **Creating the final project** window is displayed to open the created user-defined form.*



7. Click **Open** to open the solution of the .Net project. Click **Close** to close the form definition wizard.

### S3D Custom Form Definition Wizard Dialog Box

Use the S3D Custom Form Definition Wizard Dialog Box to specify the form definition location details.

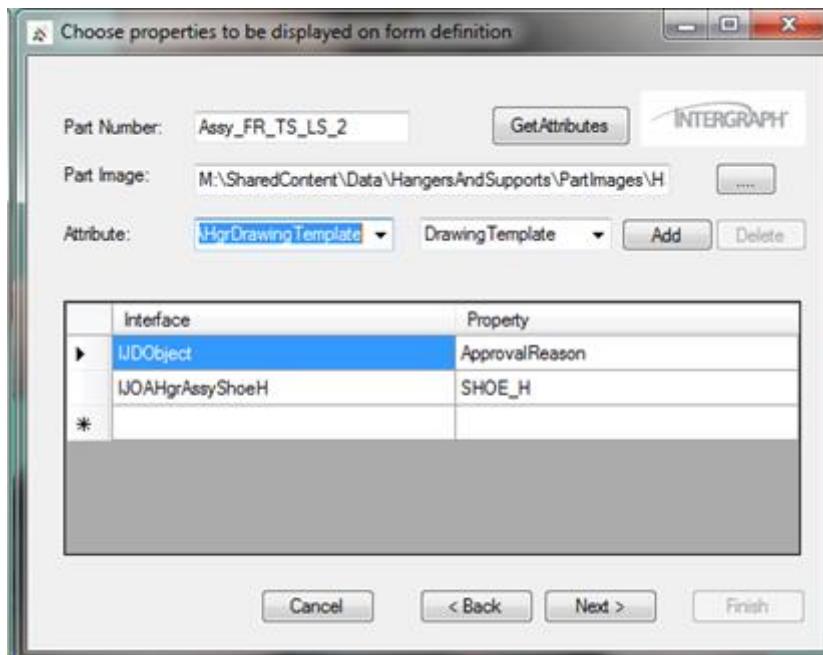


- **Plant name** - Specifies the plant name that you want to work on.

- **Project Location** - Specifies the location where the .Net project needs to be created. You can click the browse button to select the location.
- **Project Name** - Specifies the name of the project.
- **Form Name** - Specifies the name of the form.
- **Namespace** - Displays the **Project Name** that you specified previously.

### **Choose Part Properties Dialog Box**

Specifies the part properties that need to be displayed on the form definition.



- **Part Number** - Specifies the Part number.
- **GetAttributes** - Click to select the attributes to be added to the grid.
- **Part Image** - Specifies the part image. You can click the browse button to select the part image file. If you do not specify anything, then the preview image of the part is used by the software.
- **Attribute** - Select the interface attribute for the specified part number. Select the part attributes for the specified interface from the second drop-down box.
- **Add** - Adds the attribute to the form. If the selected interface and the part attributes do not exist in the data grid, **Add** is enabled and **Delete** is disabled.
- **Delete** - Deletes the attribute from the form. If the selected interface and the part attribute are already present in the data grid, **Delete** is enabled whereas **Add** is disabled.

**NOTE** The part image and the attribute controls are stored in the form that is to be created and will show up in the newly created project.

## Options

Specifies options to configure the software. The options are grouped by topic on tabs on the **Tools > Options** dialog box.

### General

Enables the **Undo** command and the status bar. In addition to allowing you to toggle these features on and off, these options specify the number of actions you can cancel using the **Undo** command and set the time allowed before activating **QuickPick**. You can also define the locate zone for the software to find SmartSketch points and for the tabs displayed in the **Workspace Explorer**.

### Colors

Selects the colors the software uses for the background, highlighted and selected objects, and handles.

### Units of Measure

Determines the units of measure that appear in the readout and key in boxes of the software. Additionally, you can specify how precisely the software displays these units.

**NOTE** All the data (length, angle, volume, mass, and so forth) are stored with the unit of measure defined in the metadata. For example, the unit of measure for length is defined as meters in the metadata. If you set the length unit as **ft** on this tab, then the software displays the length readout as **ft** by default but stores the value as meters in the database.

### ToolTips

Defines ToolTips for a selected object type. ToolTips are based on catalog labels, but they are saved to the session file. To create a label to use as a ToolTip, go to the Catalog task.

### File Locations

Sets the default path to the folder where the software saves Workspace session files, Workspace Templates, Personal Report Templates, Report Output files, and Custom Documentation.

### SmartSketch

Selects the standard SmartSketch relationship indicators you want the software to use.

### Selected PG

Restricts the edits and propagation to objects in the selected permission group.

---

### What do you want to do?

- *Change a default color* (on page 505)
- *Change a default file location* (on page 505)
- *Change a displayed unit of measure* (on page 506)

- *Change the displayed Workspace Explorer tabs* (on page 506)
- *Manage ToolTips* (on page 506)
- *Restrict edits and propagation to a Permission Group* (on page 507)
- *Set the activation time for QuickPick* (on page 507)
- *Set the Locate Zone* (on page 508)
- *Turn a SmartSketch Relationship Indicator on or off* (on page 508)
- *Turn the Status Bar on or off* (on page 508)

---

## Change a default color

1. Click **Tools > Options**.
2. Click the **Colors** tab.
3. In the list associated with the color you want to change, select a new color. You can change the color of the background, highlighted objects, selected objects, or handles.

### NOTES

- Any changes you make appear in the **Preview** box on the right side of the tab.
- Any changes you make are applied to all views in your workspace.

## Change a default file location

1. Click **Tools > Options**.
2. Click the **File Locations** tab.
3. In the **File Types** column, click the type of file for which you want to change the default location. This location is the folder selected by default when you save a new file.
4. Click **Modify**.
5. On the **Select Directory** dialog box, select the folder in which you want to save the file. The location can use a UNC path.
6. If necessary, use the hierarchy tree to find the folder in which you want to save the file.

### NOTES

- You can change the default file locations for Workspace, Workspace Template, Personal Report Template, Report Output files, and Custom Documentation.
- The software saves these file locations within the workspace, so each workspace can have its own default locations for saving files.

## Change a displayed unit of measure

1. Click **Tools > Options**.
2. Click the **Units of Measure** tab.
3. In the **Unit** column, find the type of measurement for which you want to change the default displayed unit.
4. Click in the **Readout** field of the appropriate row.
5. Select the unit of measure from the list.

### NOTES

- You can also change the number of digits after a decimal. Click in the **Precision** field, and type the number of digits you want to appear after the decimal point. The **Precision** field is not available if the units are fractional.
- The units of measure you select here appear in all ribbons, dialog boxes, **PinPoint** values, and other unit displays within your workspace. However, because the setting is saved in the workspace, your selections have no effect on the displays of other users.

## Change the displayed Workspace Explorer tabs

1. Click **Tools > Options**.
2. Click the **General** tab.
3. In the **Tabs to display in Workspace Explorer** list, click to select and clear the needed tab names. The selected tabs will be included in the **Workspace Explorer** when you restart the software.
4. Restart the software to implement the changes to the **Workspace Explorer**.

## Manage ToolTips

ToolTips are created and managed within the session file. Any changes you make to the labels assigned to ToolTips are only seen within the session file. They are not saved to the catalog.

1. Click **Tools > Options**.
2. Click the **ToolTips** tab.
3. To turn the display of ToolTips on in the graphic views, check **Show object ToolTips**.
4. To create a new ToolTip, click an empty **Object type** cell, then click the ellipsis button. The **Select Object** dialog box appears.
5. Select an object type from the hierarchy, expanding folders as needed. Click **OK** to accept the selected object type.
6. On the **ToolTips** tab, select **Catalog Data Labels** in the **Label to Use for the ToolTip** drop-down. The **Select Label** dialog box appears.
7. Select a label type from the **Label** hierarchy, expanding folders as needed.
8. Use the **Grid View** and **List View** buttons to adjust the display of available labels.
9. Select a label from the available labels and click **OK**.

10. To edit a ToolTip, select it in the **Label to Use for the ToolTip** cell, and then click **Edit ToolTip**. The **Edit Label** dialog box appears.
11. Edit the ToolTip label properties as needed.
- ! TIP** The **Edit Label** dialog box provides specific properties depending on the type of label associated with the ToolTip, either SQL label or COM label. However, the editing capabilities are similar.
12. Click **OK** to save the changes to the ToolTip label to the session file.
13. On the **ToolTips** tab, click **OK** or **Apply** to save all the ToolTip assignments to the session file.

**■ NOTE** To enable recursive expansion of embedded labels, the report RFM file must set the **ToParse** flag to **Yes**, as in the following example:

```
<DATA
  Column="ShortMaterialDescription"
  ToParse="yes"
  Visible="yes"/>
```

## Restrict edits and propagation to a Permission Group

1. Click **Tools > Options**.
2. Click the **Selected PG** tab.
3. Select the check box to restrict edits and propagation to objects in the selected permission group.
4. Select the appropriate permission group(s) from the list.

**■ NOTE** You can select the permission groups and save the session for future use. The software saves the changes only in your session. The changes do not affect other users.

## Set the activation time for QuickPick

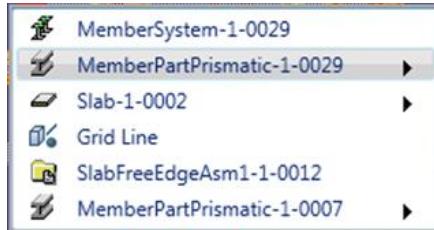
1. Click **Tools > Options**.
2. On the **General** tab, in the **Dwell Time for QuickPick** list, select the number of seconds that should lapse before the **QuickPick** feature becomes available. This time period starts when you rest the pointer on an object in the graphic view.

### ■ NOTES

- The **QuickPick** feature is available when a question mark appears beside the pointer while resting on an object.
- You can also activate **QuickPick** by pressing CTRL and clicking your mouse wheel.

Using the dwell time you set, the software displays the QuickPick question mark when the pointing device has rested after a move to indicate it has found multiple objects. This action occurs even if the pointer is not paused for an object. When the **QuickPick** feature is active, the

software highlights each object in the graphic view as you cycle through the **QuickPick** choices. For more information, see *Select objects using QuickPick* (on page 353).



## Set the Locate Zone

1. Click **Tools > Options**.
2. On the **General** tab, in the **Locate Zone** list, select the radius for the zone. The values of this box range from 3 to 12 pixels.

**NOTE** This option indicates how close the pointer must be to a specific SmartSketch point, such as the intersection of two objects or the key point of an object, before the software interprets your intentions.

## Turn a SmartSketch Relationship Indicator on or off

1. Click **Tools > Options**.
2. Click the **SmartSketch** tab.
3. Select the check box next to any relationship indicator to activate or deactivate it. A check mark indicates the option is active.

## Turn the Status Bar on or off

1. Click **Tools > Options**.
2. On the **General** tab, select the **View status bar** check box to activate or deactivate the feature. A check mark indicates the feature is active.

**NOTE** If you turn off the status bar, you cannot see any prompts when using commands.

## Options Dialog Box

Specifies options for colors, units of measure, ToolTips, file locations, SmartSketch indicators, and the selected permission group. This dialog box consists of several tabs, each containing options you can select for your workspace.

### Topics

General Tab (Options Dialog Box) .....	509
Colors Tab (Options Dialog Box).....	511
Units of Measure Tab (Options Dialog Box) .....	511
ToolTips Tab (Options Dialog Box) .....	512
File Locations Tab (Options Dialog Box).....	518
SmartSketch Tab (Options Dialog Box).....	519
Selected PG Tab (Options Dialog Box) .....	523
Point Grid Display Tab (Options Dialog Box) .....	523

## General Tab (*Options Dialog Box*)

Provides options that control the features available in the workspace.

### Undo

#### Make Undo available

Makes the **Undo** command on the toolbar and menu available. When you clear this check mark, you cannot reverse commands you perform, such as accidentally deleting an object from the model.

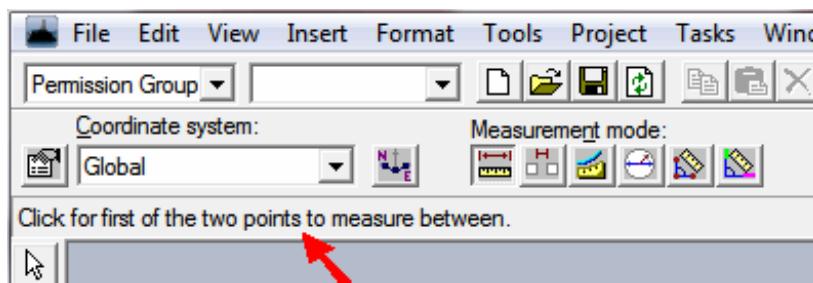
#### Number of undo actions

Select the number of previous actions that can be cancelled using the **Undo** command. The values in this box can range from 1 to 20. The initial value is 3.

### Status Bar

#### Status Bar Location

Specifies where the status bar appears. **Top** (shown below) displays the status bar above the graphic views and below the command ribbon. **Bottom** displays the status bar at the bottom of the Smart 3D window.



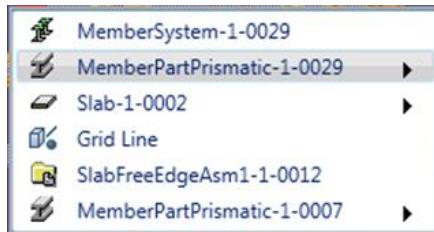
#### Locate

#### Locate Zone

Sets the size of the locate zone radius. The locate zone is a region around a pointer. The software finds SmartSketch points within the locate zone so you do not have to move the pointer to an exact position. Values from 3 to 12 pixels are valid.

#### QuickPick Dwell Time

Specifies the number of seconds the pointer must rest on an object before the pointer changes to a question mark indicating that the **QuickPick** feature is available.



**NOTE** You can also activate **QuickPick** by pressing CTRL and clicking your mouse wheel.

#### Workspace Explorer Tabs

Displays a list of tabs you can include in the **Workspace Explorer**. By default, the **Space**, **System**, and **WBS** (Work Breakdown Structure) tabs are checked.

#### NOTES

- You can also right-click a tab in the **Workspace Explorer**, and select **Hide** to hide the tab.
- Restart the software to see the changes to the **Workspace Explorer** tabs.

#### Theme

##### Floating

Select to configure the software interface for ship building. Select this option to use X, Y, and Z coordinates labels in commands such as the Grids Wizards and the **Tools > Measure** command.

##### Fixed

Select to configure the software interface for offshore modeling, such as the top side of offshore platforms. Select this option to use North, East, and Elevation coordinate labels in commands.

#### See Also

- Change the displayed Workspace Explorer tabs* (on page 506)
- Set the activation time for QuickPick* (on page 507)
- Set the Locate Zone* (on page 508)
- Turn the Status Bar on or off* (on page 508)

## Colors Tab (Options Dialog Box)

Provides options to control the colors of the background, highlighted and selected elements, and handles.

### Background

Specifies the color of all windows in your workspace. To conserve toner in your printer, use this option to change the background color to white before printing a view. You can also change the background color to white if you have difficulty seeing SmartSketch relationship indicators, **PinPoint** coordinates, or other visual feedback.

### Highlight

Specifies the color of objects when you move the pointer over them in a graphical view or in the **Workspace Explorer**.

### Selected elements

Specifies the color of objects selected with the **Select** or **Select by Filter** commands. When you move the pointer over selected objects, their color changes from the select color to the highlight color temporarily.

### Handles

Specifies the colors of the circles that appear at the corners of objects that can be enlarged or reduced by dragging with the pointer.

### See Also

*Change a default color (on page 505)*

## Units of Measure Tab (Options Dialog Box)

Provides options to set the display units used in the workspace.

### Unit

Lists the types of measures that appear in the workspace.

### Readout

Specifies the units of measure you want to display for the associated type of measure. For example, you can display all lengths in meters, while someone else can display all lengths in feet. For more information on the units of measure, see *Appendix: Units of Measure (on page 623)*.

### Precision

Specifies the number of digits you want to appear after the decimal point. The **Precision** value must be an integer. The maximum number allowed is 30.

### NOTES

- If the selected **Readout** is fractional rather than decimal, the **Precision** field is not available. The precision values are not valid with fractional units.
- If the selected **Readout** includes **(fractional)**, values will display appropriate fractional measures.

**See Also**

[Change a displayed unit of measure \(on page 506\)](#)  
[Appendix: Units of Measure \(on page 623\)](#)

## ToolTips Tab (Options Dialog Box)

Controls ToolTip content displayed by mapping labels to object types. Editing labels in the Common task should be used as a temporary test. For permanent modifications to delivered ToolTips, edit the labels in the Catalog task.

ToolTips display information about graphic objects in the model. This information can include name, part class, part number, and weight of the object. You can view ToolTips by pausing your pointer over an object in your workspace.

### Show object ToolTips

Turns the display of ToolTips with object properties on or off. When this option is selected, even object types without labels mapped to them display the name of the object as a ToolTip. When this option is cleared, no object ToolTips display. By default, this option is selected.

### Object Type

Specifies a three-dimensional object type. Click  to display the **Select Object Type** dialog box. For more information, see [Select Object Type Dialog Box \(on page 380\)](#).

### Label to Use for the ToolTip

Specifies the label content for the ToolTip that displays when the corresponding object type is selected in the model. Click **Catalog Data Labels** to display the **Select Label** dialog box. For more information, see [Select Label Dialog Box \(on page 513\)](#).

### Edit Tooltip

Displays the **Edit Label** dialog for the selected ToolTip. This functionality is not available if a ToolTip is not selected. For more information, see [Label Editor Dialog Box \(on page 514\)](#).

 **NOTE** To enable recursive expansion of embedded labels, the report RFM file must set the **ToParse** flag to **Yes**, as in the following example:

```
<DATA  
    Column="ShortMaterialDescription"  
    ToParse="yes"  
    Visible="yes"/>
```

**See Also**

[Manage ToolTips \(on page 506\)](#)

## Select Label Dialog Box

Specifies a label from the Catalog. This dialog box is accessible in both the Common task and the Drawings and Reports task.

In the Common task, this dialog box appears when you select **Catalog Data Labels** from the **Labels to Use for the ToolTip** drop-down on the **ToolTips** tab of the **Options** dialog box. After you accept the **Select Label** dialog box, the software returns the **Options** dialog box and inserts the text from the label in the **Label to Use for the ToolTip** column of the grid.

In the Drawings and Reports task, this dialog box appears when you select **More** in the **Name** drop-down on the **Labels** tab of the **Item Properties** dialog box when using **Design Layout** to format a report. After you accept the **Select Label** dialog box, the software returns the **Label Editor** dialog box with the text and properties for the chosen label.

Labels are created and maintained within the Catalog task. The **Select Label** dialog allows you to select a label and view the properties for a selected label.

### Labels

Provides the top-level folder in the navigation pane at the left of the window. Subfolders contain the various labels that have been defined in the Catalog database.

When you select a folder containing ToolTips, the right side of the dialog shows the properties associated with the selected Tooltip. The properties for the ToolTips are described as follows:

- **Name** - Specifies the name of the label or ToolTip.
- **Description** - Describes the label or ToolTip.
- **Type** - States the type of label (for example, **Label Template**).

### Properties

Displays the **Properties** for the selected ToolTip label. The properties are read-only. For more information, see *Properties Dialog Box* (on page 451).

### List View

Changes the right-side display to a list view.

### Grid View

Changes the right-side display to a grid view.

### See Also

*Manage ToolTips* (on page 506)

## Label Editor Dialog Box

Defines the contents and formatting for a label.

In the Common task, this dialog box appears when you select a ToolTip on the **Options ToolTips** tab and click **Edit Tooltips**. You can edit the formatting for the selected label and the changes are saved to the session file. Edits made to the label are not saved to the Catalog.

In the Drawings and Reports task, this dialog box appears when you select **New Format** in the **Name** drop-down on the **Labels** tab of the **Item Properties** dialog box when using **Design Layout** to format a report. You can create a new label format to use within your report.

In the Catalog task, labels are created and maintained using the **Tools > Define Label** command.

### Name

Specifies the name of the label. You can specify a label name to override the existing name or select **More** from the drop-down and edit an existing label definition. If you are accessing the label definition from the **Options ToolTips** tab, the name is read-only.

### Description

Describes the label.

### Add Row

Adds a new row to the properties list.

### Delete Row

Deletes the selected row from the properties list.

### Properties

Displays properties associated with the label. The options available are different depending on the type of label, either COM or SQL Query.

If you are working with a **COM Label**, you can add or delete property rows as needed.

If you are working with an **SQL Query Label**, the definition provides the following capabilities:

-  **Show Results Pane** - Adds a results pane to the Properties section. The results update when you execute the query.
-  **Execute Query** - Runs the query as specified. If the Results pane is shown, the results display.
-  **Properties** - Displays the **Query Parameters Designer** dialog box.
- **Name** - Specifies a name for the query.

### Layout

Provides a text field for typing text and fields to be used in the label. The options available are described as follows:

### Rich Text Format

Displays the **Font** dialog box so you can specify font, font style, font size, and font special effects to be used in the label.

 **Conditional Block**

Not available in this version.

 **#,% Field Formatting**

Displays the **Field Formatting** dialog box so you can define specific formatting for a selected field. This button is disabled unless a field is selected in the Layout text box. For more information, see *Format Field Dialog Box (Label Editor)* (on page 515).

 **Unit Formatting**

Displays the **Select Rule** dialog box for specifying a Unit of Measure formatting rule. This button is disabled unless a unit of measure field is selected in the Layout text box. For more information, see *Select Rule Dialog Box (Label Editor - Unit of Measure)* (on page 515).

 **Position Definition**

Displays the **Position Definition** dialog box for defining the display of the positional information within the label. This button is disabled unless a positional field is selected in the Layout text box. For more information, see *Position Definition Dialog Box* (on page 518).

 **Orientation Definition**

Not available in this version.

***Format Field Dialog Box (Label Editor)***

Defines the format for the selected field. The **Format Field** dialog box appears when you select a field in the Layout text box on the **Label Editor** dialog box and click **Format Field** . The dialog box is similar to the Microsoft Excel **Format Cell** command.

**Category**

Specifies the type of the formatting to assign to the field. The category controls the definition controls displayed on the dialog box.

**Sample**

Shows a sample of the selected format.

***Select Rule Dialog Box (Label Editor - Unit of Measure)***

Lists the available unit of measure rules. You can open this dialog box when you select a single field in the Layout text box on the **Label Editor** dialog box and click **Format Unit** .

**Rule Name**

Lists the names of available unit of measure rules.

**Description**

Lists the descriptions of the rules.

 **New**

Displays the **Unit of Measure** dialog box for creating a new unit of measure rule. For more information, see *Unit of Measure Dialog Box (Label Editor)* (on page 516).

 **Delete**

Deletes the selected rule.

 **Rename**

Renames the selected rule.

 **Properties**

Displays the **Unit of Measure** dialog box to review or edit the selected rule.

***Unit of Measure Dialog Box (Label Editor)***

Specifies properties for a new unit of measure rule. This dialog box appears when you click **New**  on the **Select Rule** dialog box. The properties displayed are inherited from the context in which the unit of measure label is created (that is, session, report, or drawing).

**Rule Name**

Specifies a name for the unit of measure rule.

**Description**

Describes the unit of measure rule.

**Inherit from Session, Reports, Drawing**

Indicates that the parameter should use the same units used in the session, the report, or the drawing. This option is selected by default, which makes the **Properties** read-only.

 **NOTE** To change the existing values, clear this option. You can then define a value for the **Unit Delimiter** property.

**Properties****Unit**

Displays the type of unit, such as distance.

**Primary**

Specifies the primary unit of measure, such as yards in yards, feet, inches.

**Secondary**

Specifies the secondary unit of measure, such as feet in yards, feet, inches.

**Tertiary**

Specifies the tertiary unit of measure, such as inches in yards, feet, inches.

**Displayed Unit**

Turns the display of the units on and off.

**Precision Type**

Specifies **Decimal**, **Fractional**, or **Scientific**. Your selection in this box determines the availability of the remaining boxes on this dialog box.

**Decimal Precision**

Specifies the number of places after the decimal point. This value can be 0 or greater.

**Leading Zero**

Places a zero before the decimal point, if applicable.

**Trailing Zeros**

Places zeros after the last significant digit, if applicable.

**Fractional Precision**

Specifies a fraction for the precision. The highest value that you can specify is 1/2. This box is available only if you select **Fractional** in the **Precision Type** box.

**Reduce Fraction**

Reduces the fraction. For example, displays 3/4 instead of 6/8. This box is available only if you select **Fractional** in the **Precision Type** box.

**Unit Delimiter**

Specifies the unit delimiter that you want to add between primary and secondary units in a report label. For example, 4'-3 3/4". This box is disabled if you leave the secondary unit as <BLANK> or if **Inherit from Session, Reports, Drawing** option is selected.

** NOTES**

- If you do not set the unit delimiter value, the software places two space characters between the primary and secondary units.
- You can define one unit delimiter value.
- If you want spaces between the units and the unit delimiter, add spaces to the unit delimiter value, such as "-".

**Select Rule Dialog Box (Label Editor - Position Definition)**

Lists the available position matrix rules. You can open this dialog box when you select **More** in the Matrix Rule drop-down on the **Position Definition** dialog.

**Rule Name**

Lists the names of available position matrix rules.

**Description**

Lists the descriptions of the rules.

** New**

Displays the **Matrix Rule** dialog box for creating a position matrix rule. For more information, see *Matrix Rule Dialog Box* (on page 518).

** Delete**

Deletes the selected rule.

** Rename**

Renames the selected rule.

** Properties**

Displays the **Unit of Measure** dialog box to review or edit the selected rule.

### **Matrix Rule Dialog Box**

Specifies properties for a position matrix rule. This dialog box appears when you click **New**  on the **Select Rule** dialog box.

#### **Rule Name**

Specifies a name for the unit of measure rule.

#### **Description**

Describes the unit of measure rule.

### **Position Definition Dialog Box**

Defines position information for a new label field. This dialog box appears when you select a positional field in the Layout text box on the **Label Editor** dialog box and click **Define Position** .

#### **Properties**

Displays a list of the properties currently assigned to the positional field. For example, you select the label text field <F>CGx</F> and you want to represent the value as **5.45m GlobalCS East**. You would need to define the coordinate system, the name of the +/- axes, and the read-out order for the values.

The **Matrix Rule** property provides a drop-down list of the last 10 selected rules. Selecting **Create New Rule** in the drop-down allows you to create a new positional definition rule. For more information on creating a new positional rule, see *Matrix Rule Dialog Box* (on page 518). Selecting **More** in the drop-down displays a **Browse** dialog to select an existing rule. For more information on selecting an existing rule, see *Select Rule Dialog Box (Label Editor - Position Definition)* (on page 517).

 **NOTE** The **Readout** property has a drop-down that contains all of the possible combinations for value, coordinate system, and axis, including cases where you might want to omit one of the read-out options.

### **File Locations Tab (Options Dialog Box)**

Provides options for the default file locations of Workspaces, Workspace Templates, Personal Report Templates, Report Output files, and Custom Documentation.

#### **File Types**

Displays the types of files for which you can modify default file locations. Some default locations can only be modified through reference data.

#### **Location**

Displays the default storage location and search path for workspaces, workspace templates, and other files you can create with the software. Supports the selection of a local path or a UNC path. To modify a default location, click the item, and then click **Modify** to specify a new default location.

#### **Modify**

Displays a dialog box that allows you to modify the path of the default location for the selected type of files.

## Select Directory Dialog Box

Specifies the folder in which you would like the software to save the selected type of file. The selection you make on this dialog box appears in the **Location** column on the **File Locations** tab of the **Options** dialog box.

To access this dialog box, select a type of file on the **File Locations** tab of the **Options** dialog box, and click **Modify**.

### Directory List

Displays a hierarchical list of the folders in the selected drive. Select a folder from this list and click **OK** to choose it, or double-click a folder to display any subfolders.

### Drive

Select the physical, virtual, or mapped network drive from which you want to select a folder.

### Make New Folder

Creates a new folder in the hierarchy, beneath the currently selected folder.

### See Also

*Change a default file location* (on page 505)  
*File Locations Tab (Options Dialog Box)* (on page 518)

## SmartSketch Tab (Options Dialog Box)

Specifies the SmartSketch relationship indicators you want to use in your workspace.

### Direction

#### Reference axis aligned

Displays  when you move the pointer so that the object that you are placing is aligned with either the E, N, EL-axis (X, Y, Z-axis) of the active coordinate system. For example, if you are routing a pipe that moves parallel to the E-axis (X-axis), this indicator appears.

### Point

#### Key point

Displays  when you move the pointer over the end of an element to which you can attach other elements.

#### Nozzle or other port point

Displays  when you move the pointer over an equipment nozzle or other port. Press F2 to toggle this option on and off.

#### Center point

Displays  when you move the pointer over the center of a circle or arc.

#### Point on curve

Displays  when you move the pointer over any connection point on an object, such as a nozzle on a piece of equipment.

**Intersection**

Displays  when you move the pointer over points where two or more objects overlap.

**Perpendicular**

Displays  when you move the pointer so that a perpendicular relationship between two objects is recognized. For instance, when you connect two pipes at a 90 degree angle, this indicator appears.

**Parallel**

Displays  when you place an object parallel to another object in your workspace. When this indicator appears, the software highlights the parallel objects. For example, if you add a section of pipe that runs parallel to another piece of pipe anywhere in your workspace, this indicator appears, and both objects are highlighted.

**Divisor point**

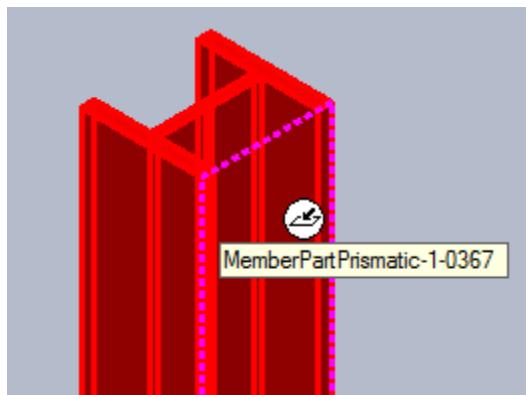
Displays  when you move the pointer to the points where a line divides equally for the number of divisions that you set. A drop down list lets you choose from 2 to 7 divisions for the line. For example, if you select 4 for the number of divisions, you get a divisor point at  $\frac{1}{4}$ ,  $\frac{1}{2}$ , and  $\frac{3}{4}$  of the length.

**Surface****Point on surface**

Displays  when you move the pointer over any location point on a surface object, such as a slab. Press F3 to toggle the option on and off.

**Virtual Box**

Displays  when you move the pointer to a bounding plane surrounding a graphical object. These bounding planes work only in conjunction with **Point on curve** and **Offset**.

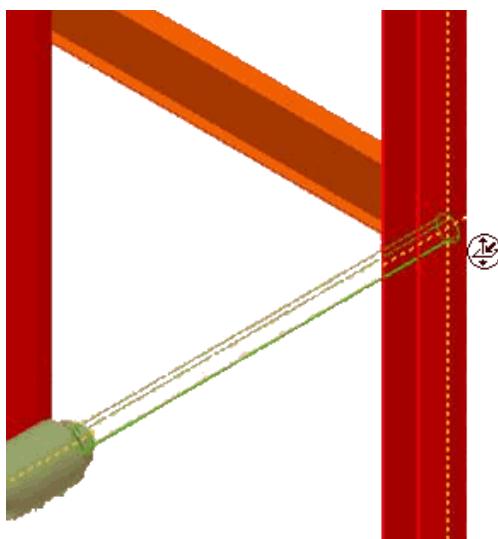
**Offset**

Displays  when you move the pointer to a location that is the specified offset from a selected element or line. **Offset** also displays **Offset from surface**.

**★IMPORTANT** You must define a projection plane to use **Offset**.

**Offset from surface** - Displays  when you point to the location of a line that is offset from the intersection of your selected projection plane with a surface that is in the

SmartSketch locate list. For example, if you are locating the end of a pipe, the indicator appears along the line that is offset from the intersection of the projection plane with the web plane.



**TIP** The offset line is often easiest to locate if your view direction is perpendicular to the projection plane.

## Object

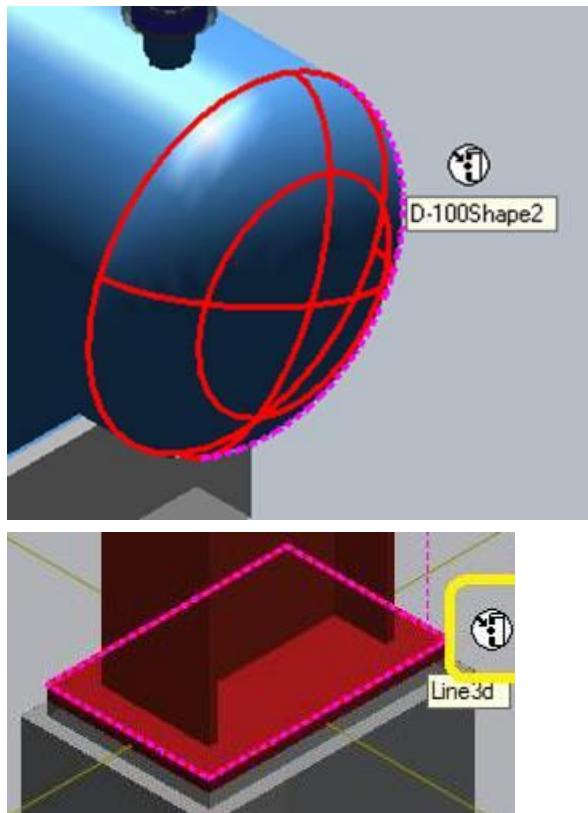
### Edges on solids

Displays when you move the pointer over the edge of a solid object.

### Silhouette edges

Displays when you move the pointer over the silhouette edges of surfaces. The

silhouette edges are the outside edges of the surface with respect to your view.



### SmartSketch 3D List

#### Locate only from list

Specifies that the software locates objects on the SmartSketch list defined when you use **Add to SmartSketch List** . For more information, see *Add to SmartSketch List* (on page 400).

#### Dwell time for stack

Specifies the number of seconds that should lapse as you pause the pointer over an object in the graphic view before that object is added to the stack.

#### Size

Specifies how many objects are added to the stack before the software begins removing previously added objects. The value in this box must be an integer greater than 1.

### NOTES

- Many of the **Add to SmartSketch List** controls also are available on the **SmartSketch Properties** dialog box accessible from the **Add to SmartSketch List** ribbon.
- You can press F3 to toggle the relationship indicator for locating surfaces on and off.
- The shortcut keys to turn on SmartSketch select mode are CTRL+D.
- The shortcut keys to set a lock constraint in SmartSketch are CTRL+L.

**See Also**

*Turn a SmartSketch Relationship Indicator on or off* (on page 508)

**Selected PG Tab (Options Dialog Box)**

Restricts edits to selected permission groups. The filter only selects objects that belong to the groups you select. If you do not select any groups, the filter includes all groups in the list.

To enable the tree view for selection, check the **Restrict edits and propagation to objects in the permission groups selected below**.

To include one or more permission groups for your objects, press CTRL and click the name of each group you want to include. You can display objects only in the groups for which you have read access. You can select several groups in a folder by selecting one group and then holding the SHIFT key and selecting another. All groups between the two are also selected.

You can add permission groups in the Project Management task.

**Point Grid Display Tab (Options Dialog Box)**

Allows you to adjust spacing between the major and minor points of a **Point Grid** in the workspace.

**Primary Point Distance**

Specify the distance to separate the primary points.

**Secondary Point Spacing**

Specify the number of equally spaced secondary points between primary points.

**Weight & CG Command**

Determines the weight and center-of-gravity of an object or set of objects.

The **Weight & CG** command is similar to the **PinPoint** command: it remains active as you work in the model and can be toggled on and off. You add objects to the select set, specify a coordinate system, and specify dry or wet weight. The software displays the total weight, coordinates of the center-of-gravity, and optionally, visual markers in the model at the coordinate system reference and center-of-gravity. You can also view a list of parts in the select set with corresponding weights and center-of-gravity coordinates.

 **NOTE** This command is available only in marine mode.

**Weight & CG Ribbon**

Sets options for calculating the weight and center-of-gravity for an object or set of objects in the model.

 **Select**

Selects objects for the calculation. You can click multiple objects (without holding the CTRL key) for inclusion in the select set.

 **Clear Latest Selection**

Removes all objects from the select set for weight and center-of-gravity. To remove just one

object, click it again. This button appears after you click **Select**.

#### **Accept Latest Selection**

Accepts all currently selected objects and finishes the selection process.

#### **Coordinate System**

Specifies a coordinate system in the workspace or defines a new coordinate system by three points.

#### **Toggle Center of Gravity**

Displays the coordinate system reference and center-of-gravity symbol .

#### **Toggle List of Parts**

Displays a table of the selected parts with their corresponding weights and centers-of-gravity.

#### **Condition**

Specifies either dry or wet weight.

#### **Weight**

Displays the weight value of the selected objects. You can specify units on the **Units of Measure** tab on the **Tools > Options** dialog box.

#### **Coordinate (X, Y, Z)**

Displays the center-of-gravity of the selected objects. You can specify units on the **Units of Measure** tab on the **Tools Options** dialog box.

#### **Close**

Ends the command. You can also end the command by clicking **Tools > Weight & CG** again.

## **Calculate Weight & CG**

1. Click **Tools > Weight & CG**.
2. On the ribbon, click **Select**.
3. Click objects in a graphic view or in the **Workspace Explorer**.
 

 **TIP** To remove an object from the select set, click it again. To remove all objects, click **Clear Latest Selection** on the ribbon.
4. When you finish adding objects to the select set, click **Add Latest Selection** on the ribbon.
5. In the **Coordinate System** box, select a coordinate system for the center-of-gravity calculation. You can choose any coordinate system in the workspace or define a new coordinate system by three points.
6. Click **Toggle Center of Gravity** if you want to see the coordinate reference and center-of-gravity markers in the graphic view.
7. Click **Toggle List of Parts** if you want to see a table of the parts in the select set with their corresponding weights and centers-of-gravity.

8. In the **Condition** box, select dry or wet weight.
9. View the weight and coordinate data in the boxes in the ribbon.
10. To end the command, click **Close** on the ribbon or click **Tools > Weight & CG** again.

**NOTE** The **Weight & CG** command is similar to the **PinPoint** command. It remains active as you work in the model and can be toggled on and off.

## SECTION 10

# Project Menu

The **Project** menu provides commands for managing project-related objects, including claiming objects to projects, releasing objects, and specifying relationships for Work Breakdown Structure (WBS) items. Some of the commands on this menu may change depending on the active task.

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## WBS Items and Projects

In Smart 3D, the Work Breakdown Structure (WBS) provides a means to define additional groupings of design objects for a variety of work purposes. In the software, the currently active Work Breakdown Structure project is shown in the drop-down list in the upper left-hand corner of the task window, next to the **Permission Group** box.



**TIP** Each time you create a new session, a blank row is the default. This blank row indicates that the active project or WBS item is set to "none."

Work Breakdown Structure grouping is hierarchical. Objects are assigned at lower levels in the hierarchy, and higher levels automatically provide consolidation. The first level of grouping object is the project. Under the project level, you can nest additional types of groupings called WBS items. Typically, WBS grouping is used for activities at the end of the engineering phase, such as activities related to the generation of deliverables and construction techniques. The following are some examples of the practical usage of WBS functionality in the software:

- **Manual Piping Isometric Sheet Management** - Normally when a pipeline isometric is generated using ISOGEN, the software automatically breaks the pipeline into multiple sheets; however, in order to reduce the number of drawings to be issued in case of revisions, many companies control the sheet assignment manually. Smart 3D provides functionality to automatically group and assign objects to a WBS item that represents a single sheet of piping isometric drawing.
- **Modularization of Pipe Racks** - In many projects, pipe racks are pre-fabricated in sections and shipped to the site for installation. A number of sections could be large on a project. You can use WBS grouping to define modules representing pipe rack sections.
- **Work Package Definition** - Although the definition of Work Package varies widely, Smart 3D WBS functionality can be applied in most situations. Typically, design objects belong to multiple work packages, which is allowed by WBS assignment logic.
- **Use of 3D models in Operation and Maintenance** – In a typical plant, the actual plant and 3D model representation keep changing due to small and large projects to improve the plant.

The as-built project is used to maintain current state of the model. You can either copy or move 3D objects to different WBS projects to manage changes being made. The Smart 3D Drawings and Reports task provides functionality to distinguish objects on the drawing based on their association with the WBS project. For example, as-built objects can be shown in one color/line style and upcoming changes related to a project can be shown in a different color/line style.

In the Common task, you can create new WBS projects and items or edit existing ones. The **New WBS Project** and **New WBS Items** commands appear on the shortcut menu when you right-click a WBS project folder or a WBS item on the **WBS** tab in the **Workspace Explorer**.

### NOTES

- Implementing WBS functionality on a project requires making decisions on common factors regardless of the end goal. Careful planning and decision making based on a study of the following factors will lead to successful usage of WBS functionality on projects. For more information, see *Appendix: Implementing a Work Breakdown Structure (WBS)* (on page 665).
- When you edit an object, it retains the current project and/or WBS item relationship. You can change the project parent using *Claim* (on page 542). You can change the WBS item relationship using *Assign to WBS* (on page 545).
- 
- In the Drawings and Reports task, the WBS is used in conjunction with publishing.

## Select Active Project Dialog Box

Displays the existing WBS hierarchy, which you can use to specify the active project. You can access the **Select Active Project** dialog box by clicking **More** in the **Active Project** box.

 **TIP** The **Active Project** box is right next to the **Permission Group** box on the main toolbar.



### Workspace

Displays WBS projects and items retrieved to the workspace based on the current **Define Workspace** filter.

### Database

Displays WBS projects and items that are in the current active database.

### See Also

*Workspace Explorer* (on page 233)

## Create WBS Project

Creates a new project. You access this command by right-clicking a WBS project folder on the **WBS** tab in the **Workspace Explorer**, and then selecting **Create WBS Project**.

### See Also

*Create a New WBS Project* (on page 534)

## Create New WBS Project Dialog Box

Displays options for defining the properties of a new WBS project.

### Type

Displays the project type.

### Project Purpose

Specifies either **As-built** or **Project**. Only one as-built WBS project is allowed per model. You cannot change purpose of the project after you create the project. This list is defined by the **WBSPurpose** codelist.

### Project Status

Specifies the current project status. This list is defined by the **WBSPStatus** codelist.

### WBS Parent

Identifies the higher-level object that is associated with the WBS item that you are creating. The WBS parent must be for a single project object or for another WBS object. You cannot change the parent after the WBS project has been created.

### Name

Specifies a name for the project or renames it.

### Correlation Status

Displays the correlation status assigned by the software. This value is read-only. The following table provides a description of the correlation statuses:

Status	Description
<b>Correlated with data match</b>	Represents objects that have a data match between the design basis data and the objects in the three-dimensional model.
<b>Correlated with data mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have a discrepancy, which generates the mismatch. The cause of the discrepancy can result from changes in the P&ID or the 3D model.
<b>Correlated with approved data mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have approved data discrepancies.
<b>Correlated with approved topology mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have approved topology discrepancy.

<b>Not correlated yet</b>	Objects that have either not been modeled from the P&ID or that have been modeled but have not been correlated with design basis data.
<b>Ignored or not claimed</b> (Project Management environment only)	Shows that the object either is not claimed (that is, it exists in the as-built condition), or that the software ignores the object (for example, revision clouds and labels).

### Correlation Basis

Specifies if the object is correlated to a corresponding design basis. Select **Correlate Object** to associate the objects in three-dimensional model with the design basis. Select **No correlation is required** if the objects do not have a correlating design basis data.

### Correlation Approval Status

Specifies if the component is approved with discrepancies in the three-dimensional data compared with design basis data. Select **Topology mismatch approved** if components topology mismatch can be ignored. Select **Data and Topology mismatches approved** if the components data and topology mismatches can be ignored. Select **None** if you do not want to approve a mismatch.

### See also

[Create WBS Project](#) (on page 528)

## **WBS Project Edit Ribbon**

Sets project properties. You can use also this ribbon to assign objects in the model to a project.

### Properties

Views and edits the properties of the project. For more information, see [WBS Project Properties Dialog Box](#) (on page 530).

### Type

Displays the type of the project.

### Purpose

Displays the purpose of the project.

### Name

Specifies the name of the project.

### WBS Parent

Displays the parent of the project. You cannot change the parent of the project; the parent is always the root node of the hierarchy.

### See Also

[WBS Items and Projects](#) (on page 526)

## **WBS Project Properties Dialog Box**

Displays the properties of the projects for edit and review. This dialog box opens when you right-click a project folder in the **Workspace Explorer**, and then select **Properties**.

### **See Also**

*Configuration Tab* (on page 151)

*General Tab (WBS Project Properties Dialog Box)* (on page 530)

*Notes Tab* (on page 181)

### **General Tab (WBS Project Properties Dialog Box)**

Displays high-level properties that identify the project, such as purpose, status, and correlation facts.

Displays options for defining the properties of a new WBS project.

#### **Type**

Displays the project type.

#### **Project Purpose**

Specifies either **As-built** or **Project**. Only one as-built WBS project is allowed per model. You cannot change purpose of the project after you create the project. This list is defined by the WBSProjectPurpose codelist.

#### **Project Status**

Specifies the current project status. This list is defined by the WBSProjectStatus codelist.

#### **WBS Parent**

Identifies the higher-level object that is associated with the WBS item that you are creating. The WBS parent must be for a single project object or for another WBS object. You cannot change the parent after the WBS project has been created.

#### **Name**

Specifies a name for the project or renames it.

#### **Correlation Status**

Displays the correlation status assigned by the software. This value is read-only. The following table provides a description of the correlation statuses:

Status	Description
<b>Correlated with data match</b>	Represents objects that have a data match between the design basis data and the objects in the three-dimensional model.
<b>Correlated with data mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have a discrepancy, which generates the mismatch. The cause of the discrepancy can result from changes in the P&ID or the 3D model.

<b>Correlated with approved data mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have approved data discrepancies.
<b>Correlated with approved topology mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have approved topology discrepancy.
<b>Not correlated yet</b>	Objects that have either not been modeled from the P&ID or that have been modeled but have not been correlated with design basis data.
<b>Ignored or not claimed</b> (Project Management environment only)	Shows that the object either is not claimed (that is, it exists in the as-built condition), or that the software ignores the object (for example, revision clouds and labels).

### Correlation Basis

Specifies if the object is correlated to a corresponding design basis. Select **Correlate Object** to associate the objects in three-dimensional model with the design basis. Select **No correlation is required** if the objects do not have a correlating design basis data.

### Correlation Approval Status

Specifies if the component is approved with discrepancies in the three-dimensional data compared with design basis data. Select **Topology mismatch approved** if components topology mismatch can be ignored. Select **Data and Topology mismatches approved** if the components data and topology mismatches can be ignored. Select **None** if you do not want to approve a mismatch.

### See also

[Create WBS Project \(on page 528\)](#)

### Configuration Tab

Displays the creation, modification, and status information about an object.

 **NOTE** You cannot define the filters using the **Configuration** tab.

### Plant

Displays the name of the model. You cannot change this value.

### Permission Group

Specifies the permission group to which the object belongs. You can select another permission group, if needed. Permission groups are created in Project Management.

### Transfer

Reassigns ownership of the selected model objects from their current permission group to another satellite or host permission group. This option is only available if the active model or project is replicated in a workshare configuration. The option is not available if all of the objects in the select set already belong to another location and are non-transferable. For more information, see *Transfer Ownership Dialog Box* in the *Common User's Guide*.

 **NOTE** The **Transfer** option does not apply to the filters and surface style rules.

#### Approval State

Specifies the current status of the selected object or filter. The display depends on your access level. You might be unable to change the status of the object. The list is defined by the ApprovalStatus codelist.

 **NOTE** You can only edit or manipulate an object with a status of **Working**.

#### Status

Specifies the location of the object in the workflow process. Changing this property sets the **Approval State**. The list is controlled by the ApprovalReason codelist in the ApprovalReason.xls file. You must bulkload this file. For more information, see *ApprovalReason* in the *Reference Data Guide*.

#### Date Created

Specifies the creation date of the object.

#### Created by

Specifies the name of the person who created the object.

#### Date Last Modified

Specifies the date when the object was last modified.

#### Last Modified by

Specifies the name of the person who last modified the object.

#### *Transfer Ownership Dialog Box*

Allows you to specify a new location and permission group for the selected model objects.

##### Current location

Displays the name of the location with which the current permission group is associated. All of the objects in the select set must belong to the same location.

##### Current permission group

Displays the name of the permission group with which the selected objects are currently associated. If all of the objects in the select set do not belong to the same permission group, this box appears blank.

##### New location

Specifies the name of the location to which you want to assign the objects. In a global workshare configuration, this box lists all the locations in which you have write access to one or more permission groups. The selection in this box filters the entries in the **New permission group** box.

##### New permission group

Specifies the new permission group to which to assign the selected objects. If you specify a value in the **New location** box, this list displays all permission groups to which you have write access in the selected location. If you do not specify a value in the **New location** box, this list includes all permission groups to which you have write access in all locations except the current location. This box is blank if you do not have write access to any permission groups at any locations other than the current one.

**NOTE** We strongly recommend that administrators follow naming convention rules that include the location as a prefix in the permission group name.

## Notes Tab

Creates and edits user-definable text placed by the designer on an object in the model. The notes provide special instructions related to the object for the fabricator and are available in downstream tasks. For example, the notes appear in two-dimensional drawings and within design review sessions.

**NOTE** Only one note of a given kind from a given object can be shown on a drawing. For example, if there are two fabrication notes on a piping part, then only one of the notes shows on the drawing. It is important to know about and to consider this situation when defining notes on an object in the modeling phase. For example, you can display one Fabrication note and one Installation note by defining two separate labels for the two kinds of notes.

### Key point

Specifies the key point on the object to which you want to add a note.

### Notes at this location, listed by name

Lists all notes for the selected key point on the object.

### Date

Displays the date that the note was created. The system automatically supplies the date.

### Time

Displays the time that the note was created. The system automatically supplies the time.

### Purpose of note

Specifies the purpose of the note.

### Author

Displays the login name of the person who created the note. The system automatically supplies this information. You cannot change this information.

### Note text

Defines the note text. The software does not limit the length of the note text.

### Show dimension

Indicates that the note generates a dimension.

If you are displaying the properties for a Support component, then a dimension can be included for the component in the Support drawings, if you select the **Show dimension** option. The note must be associated with one of the key points for the Support component. It is recommended that you set the **Purpose of note** as **Fabrication**, but this is not a requirement. The note **Name** and **Note text** are not used when you select this option.

### New Note

Creates a new note on the object.

### Standard Note

Displays a list of standard notes from which you can select. This feature is not available in this version.

**Highlight Note**

Highlights the note in the graphic view so that you can easily find the note and the object to which it is related. This feature is not available in this version.

**Delete Note**

Deletes the currently displayed note.

## Create a New WBS Project

In this procedure, you are not retrieving projects in the project list, but you are creating a new project in the **Workspace Explorer**.

1. Set the filter to **All** in the **Locate Filter** box on the main toolbar.
2. In the **Workspace Explorer**, click the **WBS** tab.
3. Right-click the model folder at the top of the tree view, and select **Create WBS Project**.
4. On the **Create WBS Project** dialog box, select the appropriate options.

**💡 TIPS**

- The grid on this dialog box has two columns. The **Property** column identifies the properties for the project. The **Value** column either displays a value that you can review but cannot change, or a value that you can type or select from a list.
- The **Name** cell is required. You cannot complete the command until you type a name.
- You cannot edit the cells that have grey shading.

5. Click **OK**.

*The new project is added to the **WBS** tab of the **Workspace Explorer**.*

6. Add WBS items to the new project as needed. For more information, see *Create a New WBS Item* (on page 542).

**☞ NOTES**

- You can create as many WBS **Project** type projects as necessary; however, only one WBS **As-Built** type project is allowed per model.
- You can delete a WBS object even if objects are related to it. However, the software deletes only the relationships, not the related objects.
- You can change a design object (that is, any object that supports the relationship to a project) from one project to another by selecting the project on the **WBS** tab and using the **WBS Project Edit** ribbon.

## Create WBS Item

Creates a new Work Breakdown Structure (WBS) item. You access this command by right-clicking a WBS project folder on the **WBS** tab in the **Workspace Explorer**, and selecting **Create WBS Item**.

### See Also

[Create a New WBS Item \(on page 542\)](#)

## Create WBS Item Dialog Box

Displays options for defining the properties of a new WBS item.

### WBS Type

Specifies the type of WBS item. Available options are defined in the current active Catalog database. The list is defined by the WBSItemType codelist.

### WBS Purpose

Specifies the purpose of the WBS item. You cannot change this property after you create the WBS item. Available options are defined in the current active Catalog database and depend on which **WBS Type** you selected. The list is defined by the WBSItemPurpose codelist.

**NOTE** If you intend to create multiple WBS Items under the same WBS Project that use more than one type of **WBS Purpose** > **Iso Drawing** (codelist entries 195-215), you must create a separate label for each style of **Iso Drawing** used in the project. For more information on creating labels, see the *Piping Isometric Drawings User's Guide*.

### Exclusive

Specifies whether an object can be related to more than one Work Breakdown Structure (WBS) object of the same type and purpose.

**True** indicates that the given object cannot be assigned to another WBS item of the same type and purpose.

**False** indicates that the given object can belong to multiple WBS items of the same type and purpose.

After the WBS item has an assigned object, this property becomes read-only.

**NOTE** All WBS items of the same type and purpose in a given project must have the same setting for the **Exclusive** property.

### WBS Assignment

Specifies the assignment type. The assignment type you select here controls the behavior of the **Assign to WBS** command in the software. The list is defined by the WBSItemAssignment codelist.

**System** indicates that Smart 3D automatically assigns all nested children of the system object to the WBS item. As you add or remove objects from that system, you can update the assignment with **Update WBS Assignment**.

**Assembly** indicates that Smart 3D automatically assigns all nested children of the assembly object to the WBS item. As you add to or remove objects from that assembly, you can update the assignment with **Update WBS Assignment**.

**Manual** indicates that Smart 3D only assigns the selected object to the WBS item. There is

no automatic assignment based on system parent or assembly. The software does not automatically update WBS assignments for objects belonging to this WBS when you run **Update WBS Assignments** or **Assign to WBS**. This is the default setting.

For any given WBS type or purpose, you can assign all systems or all assemblies, but not a mixture of both. After the WBS item has an assigned object, this property becomes read-only. To modify the assignment type, you must create a new WBS item. This option is enabled only when **Exclusive** is set to **True**.

#### **WBS Parent**

Identifies the higher-level object that is associated with the WBS item that you are creating. When the WBS item is created, this property is set to read-only.

#### **Name**

Specifies a name for the WBS item.

#### **Correlation Status**

Displays the correlation status assigned by the software. This value is read-only. The following table provides a description of the correlation statuses:

Status	Description
<b>Correlated with data match</b>	Represents objects that have a data match between the design basis data and the objects in the three-dimensional model.
<b>Correlated with data mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have a discrepancy, which generates the mismatch. The cause of the discrepancy can result from changes in the P&ID or the 3D model.
<b>Correlated with approved data mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have approved data discrepancies.
<b>Correlated with approved topology mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have approved topology discrepancy.
<b>Not correlated yet</b>	Objects that have either not been modeled from the P&ID or that have been modeled but have not been correlated with design basis data.
<b>Ignored or not claimed</b> (Project Management environment only)	Shows that the object either is not claimed (that is, it exists in the as-built condition), or that the software ignores the object (for example, revision clouds and labels).

#### **Correlation Basis**

Specifies if the object is correlated to a corresponding design basis. Select **Correlate Object** to associate the objects in three-dimensional model with the design basis. Select **No correlation is required** if the objects do not have a correlating design basis data.

### Correlation Approval Status

Specifies if the component is approved with discrepancies in the three-dimensional data compared with design basis data. Select **Topology mismatch approved** if components topology mismatch can be ignored. Select **Data and Topology mismatches approved** if the components data and topology mismatches can be ignored. Select **None** if you do not want to approve a mismatch.

## **WBS Item Edit Ribbon**

Sets the options for the properties of a Work Breakdown Structure (WBS) item. You can use this ribbon to assign objects in the model to a WBS item.

 **NOTE** If any selected object has one or more children claimed to another project, then you cannot change the WBS assignments. You need to release the claims before modifying the assignments.

### **Properties**

Views and edits the properties of the WBS item. For more information, see *WBS Item Properties Dialog Box* (on page 538).

### **Select objects to assign**

Associates objects in the model with the WBS item.

### **Clear all**

Disassociates all previously selected objects in the model with the WBS item.

### **Finish**

Commits the changes to the database.

### **Type**

Displays the type of the WBS item.

### **Purpose**

Displays the purpose of the WBS item.

### **Name**

Displays the name of the WBS item. You can type a different name if necessary.

### **WBS Parent**

Displays the parent of the WBS item. You can select a different parent if necessary.

### **See Also**

*WBS Items and Projects* (on page 526)

## ***WBS Item Properties Dialog Box***

Displays the properties of the Work Breakdown Structure (WBS) items for edit and review. This dialog box opens when you right-click a WBS item in the **Workspace Explorer** and then click **Properties**.

### **See Also**

*Create WBS Item* (on page 535)  
*WBS Items and Projects* (on page 526)

#### ***General Tab (WBS Item Properties Dialog Box)***

 **NOTE** The following common properties are provided for the **Standard** category and are identical to those that display on the **Create WBS Item** dialog box.

Displays options for defining the properties of a new WBS item.

#### **WBS Type**

Specifies the type of WBS item. Available options are defined in the current active Catalog database. The list is defined by the WBSItemType codelist.

#### **WBS Purpose**

Specifies the purpose of the WBS item. You cannot change this property after you create the WBS item. Available options are defined in the current active Catalog database and depend on which **WBS Type** you selected. The list is defined by the WBSItemPurpose codelist.

 **NOTE** If you intend to create multiple WBS Items under the same WBS Project that use more than one type of **WBS Purpose > Iso Drawing** (codelist entries 195-215), you must create a separate label for each style of **Iso Drawing** used in the project. For more information on creating labels, see the *Piping Isometric Drawings User's Guide*.

#### **Exclusive**

Specifies whether an object can be related to more than one Work Breakdown Structure (WBS) object of the same type and purpose.

**True** indicates that the given object cannot be assigned to another WBS item of the same type and purpose.

**False** indicates that the given object can belong to multiple WBS items of the same type and purpose.

After the WBS item has an assigned object, this property becomes read-only.

 **NOTE** All WBS items of the same type and purpose in a given project must have the same setting for the **Exclusive** property.

#### **WBS Assignment**

Specifies the assignment type. The assignment type you select here controls the behavior of the **Assign to WBS** command in the software. The list is defined by the WBSItemAssignment codelist.

**System** indicates that Smart 3D automatically assigns all nested children of the system object to the WBS item. As you add or remove objects from that system, you can update the assignment with **Update WBS Assignment**.

**Assembly** indicates that Smart 3D automatically assigns all nested children of the assembly object to the WBS item. As you add to or remove objects from that assembly, you can

update the assignment with **Update WBS Assignment**.

**Manual** indicates that Smart 3D only assigns the selected object to the WBS item. There is no automatic assignment based on system parent or assembly. The software does not automatically update WBS assignments for objects belonging to this WBS when you run **Update WBS Assignments** or **Assign to WBS**. This is the default setting.

For any given WBS type or purpose, you can assign all systems or all assemblies, but not a mixture of both. After the WBS item has an assigned object, this property becomes read-only. To modify the assignment type, you must create a new WBS item. This option is enabled only when **Exclusive** is set to **True**.

#### **WBS Parent**

Identifies the higher-level object that is associated with the WBS item that you are creating. When the WBS item is created, this property is set to read-only.

#### **Name**

Specifies a name for the WBS item.

#### **Correlation Status**

Displays the correlation status assigned by the software. This value is read-only. The following table provides a description of the correlation statuses:

Status	Description
<b>Correlated with data match</b>	Represents objects that have a data match between the design basis data and the objects in the three-dimensional model.
<b>Correlated with data mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have a discrepancy, which generates the mismatch. The cause of the discrepancy can result from changes in the P&ID or the 3D model.
<b>Correlated with approved data mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have approved data discrepancies.
<b>Correlated with approved topology mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have approved topology discrepancy.
<b>Not correlated yet</b>	Objects that have either not been modeled from the P&ID or that have been modeled but have not been correlated with design basis data.
<b>Ignored or not claimed</b> (Project Management environment only)	Shows that the object either is not claimed (that is, it exists in the as-built condition), or that the software ignores the object (for example, revision clouds and labels).

#### **Correlation Basis**

Specifies if the object is correlated to a corresponding design basis. Select **Correlate Object** to associate the objects in three-dimensional model with the design basis. Select **No**

**correlation is required** if the objects do not have a correlating design basis data.

#### Correlation Approval Status

Specifies if the component is approved with discrepancies in the three-dimensional data compared with design basis data. Select **Topology mismatch approved** if components topology mismatch can be ignored. Select **Data and Topology mismatches approved** if the components data and topology mismatches can be ignored. Select **None** if you do not want to approve a mismatch.

#### See Also

*Create a New WBS Project* (on page 534)

*WBS Item Properties Dialog Box* (on page 538)

#### Configuration Tab

Displays the creation, modification, and status information about an object.

**NOTE** You cannot define the filters using the **Configuration** tab.

#### Plant

Displays the name of the model. You cannot change this value.

#### Permission Group

Specifies the permission group to which the object belongs. You can select another permission group, if needed. Permission groups are created in Project Management.

#### Transfer

Reassigns ownership of the selected model objects from their current permission group to another satellite or host permission group. This option is only available if the active model or project is replicated in a workshare configuration. The option is not available if all of the objects in the select set already belong to another location and are non-transferable. For more information, see *Transfer Ownership Dialog Box* in the *Common User's Guide*.

**NOTE** The **Transfer** option does not apply to the filters and surface style rules.

#### Approval State

Specifies the current status of the selected object or filter. The display depends on your access level. You might be unable to change the status of the object. The list is defined by the **ApprovalStatus** codelist.

**NOTE** You can only edit or manipulate an object with a status of **Working**.

#### Status

Specifies the location of the object in the workflow process. Changing this property sets the **Approval State**. The list is controlled by the **ApprovalReason** codelist in the **ApprovalReason.xls** file. You must bulkload this file. For more information, see **ApprovalReason** in the *Reference Data Guide*.

#### Date Created

Specifies the creation date of the object.

#### Created by

Specifies the name of the person who created the object.

#### Date Last Modified

Specifies the date when the object was last modified.

#### Last Modified by

Specifies the name of the person who last modified the object.

#### Notes Tab

Creates and edits user-definable text placed by the designer on an object in the model. The notes provide special instructions related to the object for the fabricator and are available in downstream tasks. For example, the notes appear in two-dimensional drawings and within design review sessions.

**NOTE** Only one note of a given kind from a given object can be shown on a drawing. For example, if there are two fabrication notes on a piping part, then only one of the notes shows on the drawing. It is important to know about and to consider this situation when defining notes on an object in the modeling phase. For example, you can display one Fabrication note and one Installation note by defining two separate labels for the two kinds of notes.

#### Key point

Specifies the key point on the object to which you want to add a note.

#### Notes at this location, listed by name

Lists all notes for the selected key point on the object.

#### Date

Displays the date that the note was created. The system automatically supplies the date.

#### Time

Displays the time that the note was created. The system automatically supplies the time.

#### Purpose of note

Specifies the purpose of the note.

#### Author

Displays the login name of the person who created the note. The system automatically supplies this information. You cannot change this information.

#### Note text

Defines the note text. The software does not limit the length of the note text.

#### Show dimension

Indicates that the note generates a dimension.

If you are displaying the properties for a Support component, then a dimension can be included for the component in the Support drawings, if you select the **Show dimension** option. The note must be associated with one of the key points for the Support component. It is recommended that you set the **Purpose of note** as **Fabrication**, but this is not a requirement. The note **Name** and **Note text** are not used when you select this option.

#### New Note

Creates a new note on the object.

#### Standard Note

Displays a list of standard notes from which you can select. This feature is not available in

this version.

#### **Highlight Note**

Highlights the note in the graphic view so that you can easily find the note and the object to which it is related. This feature is not available in this version.

#### **Delete Note**

Deletes the currently displayed note.

### **Create a New WBS Item**

1. Right-click a WBS project folder on the **WBS** tab in the **Workspace Explorer**, and select **Create WBS Item**.
2. On the **Create WBS Item** dialog box, specify a name for the new WBS item, and set the properties as needed.  
*General Tab (WBS Item Properties Dialog Box) (on page 538)*
3. Click **OK**.

*The new WBS item is created in the **Workspace Explorer** hierarchy.*

#### **NOTES**

- The **Exclusive** property controls whether objects can belong to more than one WBS item that has the same type and purpose.
- All WBS items of the same type and purpose in a given project must have the same settings for the **Exclusive** property.
- The **WBS Assignment** property controls the behavior of the **Assign to WBS** command. For example, you can define properties that allow you to use the system or assembly hierarchy to automatically assign objects to the WBS item.
- When a WBS item is created in Smart 3D, the following properties are set to read-only: **WBS Parent** and **Correlation Status**. After a WBS item has an assigned object, the following properties become read-only: **Exclusive** and **WBS Assignment**.
- You can undo the creation of a new WBS item.
- You can copy and paste a new WBS item.

## **Claim**

Claims objects exclusively to the active project.

**★IMPORTANT** The **Claim** command requires that at least one as-built project exists. For more information, see *WBS Items and Projects* (on page 526).

To claim objects to a project, you must have Write permission to the project. You can, however, modify the objects without having Write permission to the project object. For example, piping designers only need Write permission to the piping features and parts, not to the project.

Certain objects require Write permission to other related objects for modifications, but the related objects are not claimed automatically when you claim the primary object, such as nozzles on equipment. If you try to modify the relationship between the objects, the software displays a permission error stating that you have not claimed both objects.

In other cases, the software automatically claims objects that are related to the object that you are claiming. For example, control points are claimed when you claim the parent object, such as a piece of equipment. This behavior goes both ways. If you claim the equipment, the associated control points are also claimed. Other examples are supports/support components, member systems/member parts, member systems/frame connections, slabs/openings, and slabs/slab assembly connections.

To reassign a claim, use **Project > Release Claim**. This command moves the claimed objects back to as-built and releases any relationships to other WBS objects. Another project can then claim the object with the **Claim** command.

### NOTES

- When selecting objects to claim, make sure that you select only the objects that you want to claim. For example, when you "fence select" a pump, you might accidentally select more than the pump object. You select the nozzles associated with the pump. You can also select the foundation under the pump, even though the foundation is not nested under the pump in the **Workspace Explorer**.
- *Exclusive claim* means that the active project is the only project that can modify the claimed object.
- If errors occur when using the **Claim** command, refer to the *Troubleshooting Reference Guide* in **Help > Printable Guides** for additional information.

## Claiming Objects

When you work in an integrated environment, you must identify the objects that will be modified and associate them with a project. This identification is also known as claiming.

The **Claim** command creates a relationship between the selected object and a project object.

### IMPORTANT

- In an integrated environment, exclusive claims are specific to the tool. Although a Smart 3D project has exclusive claim on a piece of equipment, SmartPlant P&ID and Aspen Basic Engineering users can still claim and modify the 2D version of the object in their respective tools.
- You should publish the model prior to claiming. For more information on publishing the model, see the Drawings and Reports Help.

You can claim objects in the software by selecting objects in the model, choosing an active WBS project, and then clicking the **Claim** command. You can also use the **View P&ID** command or create a select filter to choose objects for claiming.

To claim objects to a project, you must have Write permission to the project. However, Write permission to the project is not necessary in order to modify those objects. For example, piping designers only need Write permission to the piping features and parts, not to the project.

Certain objects require Write permission to other related objects for modifications, but the related objects are not claimed automatically when you claim the primary object, such as nozzles on equipment. If you try to modify the relationship between the objects, the software displays a permission error stating that you have not claimed both objects.

In other cases, the software automatically claims objects that are related to the object that you are claiming. For example, control points are claimed when you claim the parent object, such as a piece of equipment. This behavior goes both ways. If you claim the equipment, the associated control points are also claimed. Other examples are supports/support components, member

systems/member parts, member systems/frame connections, slabs/openings, and slabs/slab assembly connections.

To reassign a claim to the as-built, use **Project > Release Claim**. This command moves the claimed objects back to as-built, as well as releasing any relationships to other WBS objects. For more information, see [Releasing Claims](#). Reassigning a claim is a two-step process. First, you use **Release Claim** to set the relationship back to as-built, and then you claim to a new project. To release a claim in an integrated environment, you must switch to the **Drawings and Reports** task and publish at least one document containing the released objects.

## Claim Objects

1. Select the objects that you want to claim. For example, when you "fence select" a pump, you might accidentally select more than the pump object. You select the nozzles associated with the pump. You can also select the foundation under the pump, even though the foundation is not nested under the pump in the **Workspace Explorer**.
2. In the **Active Project** box on the main toolbar, specify a project.  
**TIP** If the appropriate WBS project does not appear in the list, click **More** to open the *Select Active Project dialog box* (on page 237).
3. Click **Project > Claim**.

*The software associates the objects with the active project. If no as-built projects are available, an error message requests that you create a project in the **Workspace Explorer** and choose **As-built** in the **Project Purpose** field. You can then re-run the command.*

### NOTES

- You must have an as-built project for the **Claim** command to run. For more information, see [WBS Items and Projects](#) (on page 526).
- You must have Write access to the active project in order to claim an object to it. For more information, see [WBS Items and Projects](#) (on page 526).
- An object can be related to only a single project. If you attempt to claim an object that belongs to another project, the claim will fail. You must use the **Release Claim** command to set the relationship back to the as-built and then re-run the **Claim** command to claim it to the new project. For more information, see [Release Claim](#) (on page 544).
- You can create a filter of objects by project and set a style rule, so objects belonging to a certain project are easily distinguished.
- If errors occur when using the **Claim** command, refer to the *Troubleshooting Reference Guide* in **Help > Printable Guides** for additional information.

## Release Claim

Reassigns the selected objects back to as-built so that another project can claim them.

You claim objects to the active project for the purpose of editing or modifying the objects. Sometimes you need to release a claim on an object. For example, you may have claimed an object by mistake, or another project may need to work on the object. The **Release Claim**

command reassigns a claim from the active project back to as-built so that another project can claim it.

### NOTES

- To remove a new object from the active project, you can delete the object.
- If problems occur when using the **Release Claim** command, refer to the *Troubleshooting Guide* in **Help > Printable Guides** for additional information.
- You must have **Write** permission to both the project and the as-built to release an object, and the status of both the project and the as-built must be **Working**.

## Release Claimed Objects

The **Release Claim** command requires that an as-built project exists.

1. Select objects in the model by clicking in a graphic view, dragging a fence around objects, or selecting by filter.
2. Click **Project > Release Claim**.

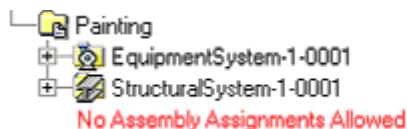
*The software reassigns the selected objects back to the as-built project and removes any relationships to the other Work Breakdown Structure (WBS) items, such as contracts.*

## Assign to WBS

Creates a relationship in the database between each object in the select set and the selected Work Breakdown Structure (WBS) item in the **Workspace Explorer**. These relationships display on the **Relationships** tab of the object **Properties** dialog box.

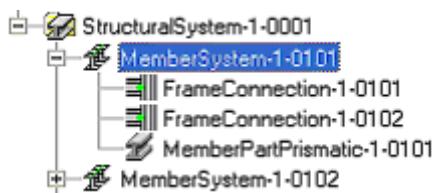
WBS assignment is controlled by the software to enforce certain conditions. Rules for assignment to WBS items are defined by properties of the WBS item. For more information, see *General Tab (WBS Item Properties Dialog Box)* (on page 538). To support automatic assignments and updates, the **Assign to WBS** command uses the following rules:

- For a given WBS item with a specific type and purpose, you can assign all systems or all assemblies, but not a mixture of both. In the following example, because the first type of assignment under **Painting** is a system assignment, the **Assign to WBS** command only allows you to assign other systems (or individual objects) to the **Painting** WBS item.



- When you assign a system or an assembly to a WBS item, the **Assign to WBS** command automatically assigns all associated objects to the WBS item as well. For example, suppose you assign **MemberSystem-1-0101** to the **Painting** WBS item. The **Assign to WBS**

command assigns **FrameConnection-1-0101**, **FrameConnection-1-0102**, and **MemberPartPrismatic-1-0101** to the **Painting** WBS item automatically.



- When you assign a higher-level system or an assembly object to a different WBS item, the **Assign to WBS** command prompts you to move the sub-objects to the new WBS item.

You can manually assign objects to WBS items after they have been created. You can determine which object classes are assigned during the manual assignment by editing the object class list in the `WBSAssignableNames_Manual.txt` file delivered in the `SharedContent` share. Only object classes in this file are assigned during the manual assignment. If the `WBSAssignableNames_Manual.txt` file is deleted, all selected objects are assigned to WBS.

You can also have the objects assigned automatically as you create them by setting the active WBS project or WBS item during modeling. If a WBS project is identified in the **Active Project** box on the main toolbar, all new objects are claimed to that active project when they are created. If a WBS item is identified, objects are first claimed to the parent project of the WBS item and then assigned to the WBS item. Only lowest-level objects, commonly termed as parts, are automatically assigned. For example, design objects like piping features or grouping objects like pipelines are not assigned, but piping parts are assigned. The automatic assignment of objects to WBS is controlled by the `WBSAssignableNames.txt` file located in the `SharedContent` share. You can modify the file to determine which object classes are automatically assigned.

## NOTES

- The **Update WBS Assignments** command handles cases where you add new objects to a system or an assembly as part of the 3D modeling tasks, or when you move systems or modify the system hierarchy.
- The **Assign to WBS** command always checks to make sure that, at the time of assignment, a system or assembly and all sub-objects are valid for assignment.
- When assigning a pipe run to the WBS item, you must select the entire pipe run. Use the *Locate Filter* (on page 156) or **QuickPick** to help with selecting the entire pipe run.

## See Also

[Assign Objects to a WBS Item \(on page 547\)](#)  
[WBS Items and Projects \(on page 526\)](#)

## Assign to WBS Dialog Box

Creates a relationship between the objects in the select set and the selected Work Breakdown System (WBS) item.

### Look in

Specifies whether you want to look in the workspace or in the Model database for the WBS items.

### See Also

*Assign to WBS* (on page 545)

## Assign Objects to a WBS Item

1. Select the active WBS project in the **Active Project** box on the main toolbar.  
**TIP** If the appropriate WBS project does not appear in the list, click **More** to open the *Select Active Project dialog box* (on page 237).
2. Select objects in the model by clicking in a graphic view, dragging a fence around objects, or selecting by filter.  
**TIP** When assigning a pipe run to the WBS item, you must select the entire pipe run. Use **QuickPick** to help with selecting the entire pipe run.
3. Click **Project > Assign to WBS**.
4. On the **Assign to WBS** dialog box, specify **Workspace** or **Database** to update the hierarchy of WBS items.
5. Select the WBS item to which you want the selected objects assigned.
6. Click **OK** to create the relationships between the objects in the select set and the selected WBS item.
7. Verify the relationship by selecting an object and doing one of the following:
  - Select an object and view the **Relationship** tab on its **Properties** dialog box.
  - Select the WBS item in the **Workspace Explorer** and click  **Select objects to assign** on the **WBS Item Edit** ribbon. All of the associated objects highlight in the graphical view.
  - Right-click the WBS item in the **Workspace Explorer** and click **Select Nested**. All of the associated objects highlight in the graphical view.

### NOTES

- If no as-built project exists, then a message indicates that the command requires an as-built project. You can create an as-built project in the **Workspace Explorer** by setting **As-built** in the **Project Purpose** field. For more information, see *WBS Items and Projects* (on page 526).
- If the select set contains objects that are already claimed to the parent project of the selected WBS item, or the objects are not claimed to another project through another WBS assignment, then the command highlights the objects and displays a message asking if you want to continue with the assignment on the other objects.
- If some objects cannot be assigned because of assignment type problems, a message appears. Click **Yes** to continue with the valid objects.

- If some of the objects are not valid because they are assigned exclusively, a message appears. Click **Yes** to change the assignment of the highlighted objects.

#### See Also

[Assign to WBS \(on page 545\)](#)

## Remove All Objects from a WBS Item

- Select a WBS item in the **Workspace Explorer**.
- Click **Select objects to assign** on the **WBS Item Edit** ribbon.  
*All of the associated objects highlight in the graphical view.*
- Click **Clear all** on the ribbon to clear all selections, and then click **Finish**.

## Update WBS Assignments

Updates system and assembly Work Breakdown Structure (WBS) assignments.

Any given project could contain many different WBS items. Membership, for performance reasons, is not updated automatically as you add or remove objects from systems and assemblies as part of your 3D modeling tasks. The **Update WBS Assignments** command resolves system and assembly assignments whenever you require them to be updated.

For more information on assigning objects to WBS items, see [Assign to WBS \(on page 545\)](#).

#### See Also

[Update WBS Assignments \(on page 548\)](#)

## Update WBS Assignments

- Select one or more WBS items to update in the **Workspace Explorer**.  
*The WBS objects highlight in the select color.*
- Click **Project > Update WBS Assignments**.  
*All WBS assignments for the selected objects update.*

#### NOTES

- If any of the objects have WBS assignment conflicts, then a confirmation message appears. In cases where one of the assignments requires exclusive membership, the command changes the object and its children to the more restrictive assignment. Click **Yes** to continue processing the update.
- If an object belongs to an assigned system or assembly object (or both), then the software assigns the object to the same WBS item as the owning object. Any nested objects are assigned.
- If an object belongs to more than one WBS item and one of the WBS items is set to exclusive, then the object is put on the **To Do List** in an error state to be resolved. You can modify the WBS item to clear assignments when there are conflicts.

## SECTION 11

# SmartPlant Menu

The **SmartPlant** menu provides commands for publishing documents or retrieves revisions from engineering documents. It also provides the tools for correlating and comparing with the design basis. Some of the commands on this menu may change depending on the active task. The **SmartPlant** menu is only available in the Common, Electrical, Equipment, and Piping tasks.

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## Smart 3D in an Integrated Environment

Using Intergraph Smart™ 3D in an integrated environment allows you to re-use data in Smart 3D that has already been typed into authoring tools such as SmartPlant® P&ID and SmartPlant Instrumentation.

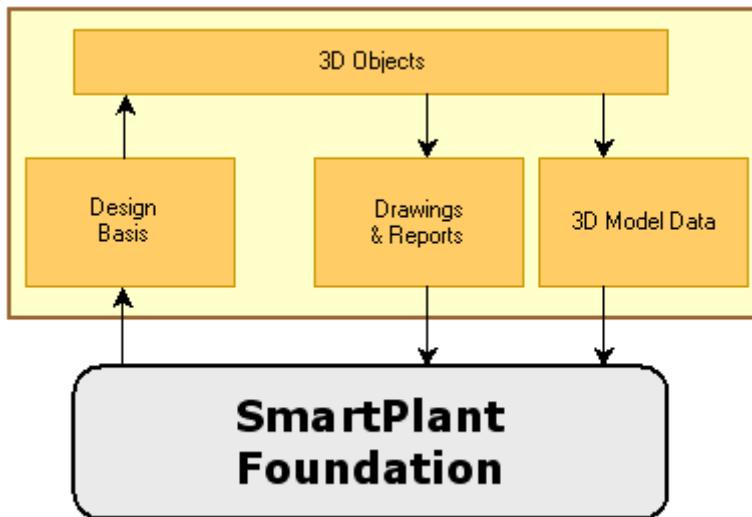
In this integrated environment, data is published to and retrieved from a central repository. During a publish operation, drawings, reports, or 3D model data is sent to the repository. During a retrieve operation, the design basis is brought into the software and then related to 3D objects. Design basis is the term used for piping, instrumentation, electrical, and equipment data from other applications outside Smart 3D.

The role of SmartPlant Foundation is crucial in an integrated environment, not only from the standpoint of managing the transfer of the data but also setting up the project structure.

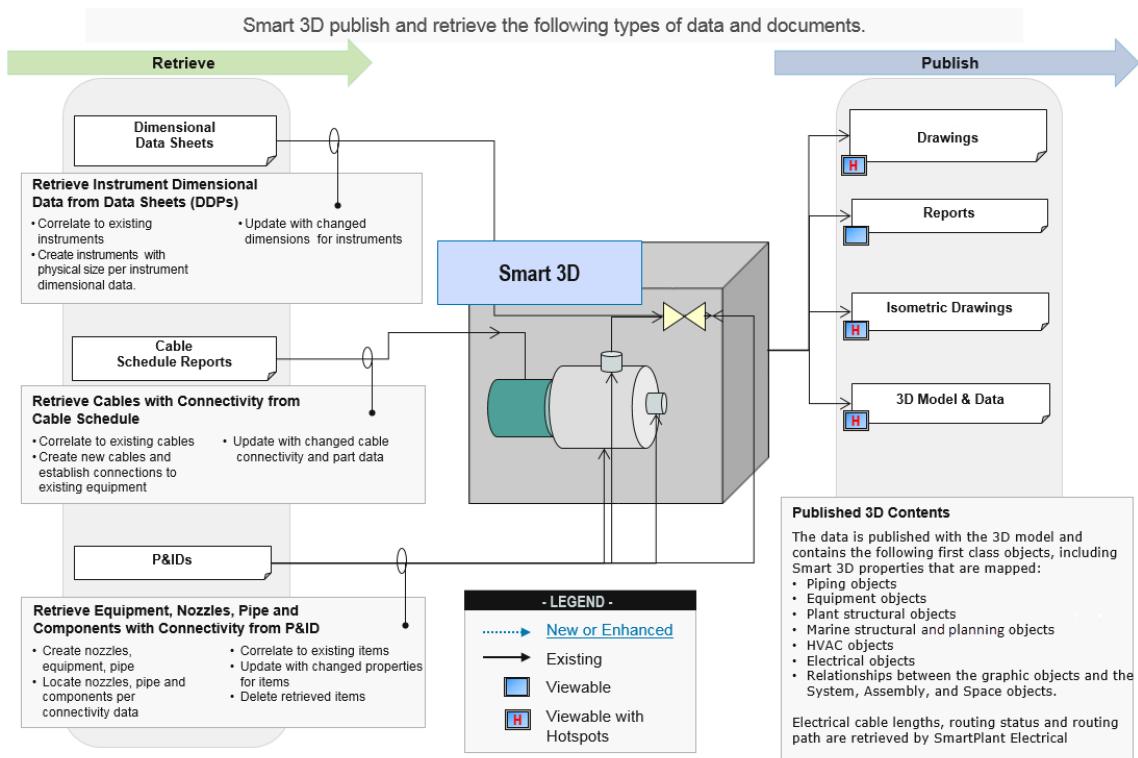
Before any project work is created, the project structure must be created in SmartPlant Foundation and then published. The published structure is then retrieved into the authoring tools. The retrieval of this PBS (Plant Breakdown Structure) automatically creates the same structure in the tools. Then, when data is created in the authoring tools, the publish functionality automatically groups items in SmartPlant Foundation to that structure and builds relationships among the data within that PBS. For more information, see *Retrieving Data* (on page 565) in the *Integration Reference Guide*. The PBS can also be created directly in the 3D model. For more information, see *Creating a Plant Breakdown Structure without Retrieving a PBS Document* in the *Integration Reference Guide*.

If a new area or project is created in an authoring tool, but not in SmartPlant Foundation, a publish operation places that data at the top level of the plant in SmartPlant Foundation.

The following graphic shows the publish and retrieve operations along with the central repository (SmartPlant Foundation) in a conceptual manner.



The following graphic shows a more detailed view of the publish and retrieve operations. You can see the flow of data and the different types of data.



- Smart 3D can retrieve P&IDs, SmartPlant Electrical cable schedules, SmartPlant Instrumentation DDP files, Plant Breakdown Structure (PBS). The retrieved information assists you in creating and modifying objects in the model. For example, after you retrieve a

P&ID, you can use the P&ID Viewer in Smart 3D for guidance when routing pipe, inserting components and instruments, and placing equipment in the 3D model.

- In the Smart 3D Drawings and Reports task, you can publish orthographic drawings, isometric drawings, drawings by rule, and reports as view files. The view files include relationships to the 3D model data. You can publish 3D model data for use with SmartPlant Foundation and SmartPlant Review. The 3D model data can include data related to the orthographic, isometric, and report documents. For more information, see the *Drawings and Reports Help*.
- SmartPlant P&ID interfaces with Smart 3D Catalog data through the Remote Piping Specification data. This connection allows the P&ID user to validate components against the catalog data before you retrieve it in Smart 3D. Remote Piping Specifications require additional setup in Smart 3D and P&ID. Please refer to the *SmartPlant P&ID Utilities Guide* for more information.

## Intergraph Work Process Guides

Intergraph Work Process guides map the process, power, and marine industries' basic work processes to SmartPlant Enterprise and SmartMarine Enterprise solutions. This documentation helps your organization transition from previous work practices to using Intergraph tools as the new way of executing projects. These documents are available on <https://smartsupport.intergraph.com> (<https://smartsupport.intergraph.com>) under **View Documentation > Work Process Guides**.

**Enterprise Work Processes** describe an entire engineering discipline or process at two different levels, including:

- Providing a swim lane diagram to define the typical roles and high-level processes involved in a project
- Showing how Intergraph tools are used to produce required deliverables

**Integration Capability Statements** describe a specific work process among a set of Intergraph tools, including:

- Explaining the out-of-the-box capabilities of the tools and their recommended use
- Providing a swim lane diagram to show how the tools interact in the work process
- Stating critical requirements and precautions

Enterprise Work Processes and Integration Capability Statements offer a better understanding of how Intergraph tools work together and how to adapt the tools to improve existing work processes.

## Understanding Integration Terminology

In the context of integration, certain terms carry a specific connotation for their usage with Smart 3D. The following terms are used frequently when you use the software.

- **Work Breakdown Structure (WBS)** - The composition of the model based on the construction work to be completed. The model occupies the top level of the hierarchy (area), followed by projects, contracts, and documents.
- **Area** - A group of work organized primarily by geographic position relative to a named volume or area to which you can assign a relationship.

- **Project** - The scope of work approved for capital expenditure; a financed set of work (that is, a job). Normally, a project begins in the design world and then progresses to the physical world when the actual construction is approved.
- **Contract** - A specific contract to the fabricator or erector. You can associate published documents to a contract and then reassign the document from one contract to another. You can also assign documents to multiple contracts.
- **As-built** - Describes the computer model intended to accurately represent the physical model as it was built (constructed). Objects in the as-built model contain property values (for example, contractor or industry commodity codes) that associate the model objects to physical objects in the model. The accuracy of this model depends on the incorporation of changes based on changes made in the actual model during construction. If no such changes are made, the model is "as-designed."
- **As-designed** - Describes the computer model that depicts the design of the physical model. This model does not use property values (that is, serial numbers) but identifies objects by a tag number or actual location. Currently, the authoring tools update the as-designed model, not the as-built model.
- **As-is** - Describes the set of physical objects that actually exist in the model. The as-is model is not a computer model but a physical entity.
- **Claim** - To identify objects as part of a project.
- **Design Basis** - A collection of objects that represent the pieces of data from other authoring tools outside of Smart 3D.
- **Design object** - Any object that you can select with a property page. An object can be related to one or more contracts of different types. Or, you can limit this relationship to only one contract of a given type, by setting the **Exclusive** property.
- **Part** - An object managed for production by a unique identity.
- **Assembly** - A set of parts, using a unique identity, grouped together for production purposes.
- **Pipe spool** - A set of piping parts assembled in a workshop and installed as a unit in the field. Typically, a pipe spool represents the lowest level assembly of piping parts. The Piping task includes commands to automatically define the spool groupings based on rules.
- **Pipe run** - A piping path with the same nominal pipe diameter (NPD). The contents of a pipe run use the same specification and have the same service.
- **Pipeline** - A collection of pipes and components that form a distribution system.

### Hierarchy for Work Breakdown Structure

The organization of components in the Work Breakdown Structure (WBS) differs between an owner/operator company and an engineering, procurement, and construction (EPC) company.

The hierarchy for an owner/operator WBS is as follows. In the graphic, notice that the as-built and project objects share the same level.

- Plant
  - As-built
  - Project
    - Contract

An EPC has the following hierarchy for WBS:

- Plant
  - Area
    - Unit
      - Assembly
        - Part

### See Also

*Retrieve Documents (on page 569)*

## Integrating with SmartPlant Enterprise

The following lists include rules that must be followed when using Smart 3D in an integrated environment. Following these rules allows Smart 3D data to be shared correctly with SmartPlant P&ID, SmartPlant Instrumentation, SmartPlant Electrical, and other tools. Other tools that are not listed here have no known Smart 3D integration concerns.

### Important Points to Remember

- To ensure piping properties are passed correctly from SmartPlant P&ID to Smart 3D, you must specify the value **SmartPlant 3D** for the **Use Piping Specification** property in SmartPlant P&ID Options Manager.
- For proper P&ID correlation, SmartPlant P&ID and Smart 3D must use the same naming convention for piping components and equipment. For example, piping reducers must use the same name, such as **Concentric Size Change** or **Concentric Reducer**, in both SmartPlant P&ID and Smart 3D.
- The **To Do Lists** in the 2D design basis applications are different from the Smart 3D **To Do List** accessed from the **View** menu. The other tools **To Do Lists** show the tasks required to update information in an integrated SmartPlant environment. Specifically, these **To Do Lists** aid in retrieving data by providing a list of all the items that must be added, deleted, or modified in the tool. The Smart 3D **To Do List** shows inconsistencies in the model when one of two situations occurs: 1) an object has lost a relationship with another, required object, or 2) an object becomes outdated due to permission constraints when you modify a relationship in the model. Items that could appear in the **To Do List** are flow direction problems, invalid connections, or parts not found.
- You should use the Smart 3D **To Do List** along with the P&ID Viewer to ensure that all inconsistencies are corrected in the model and in the design basis.
- You can run a report in Smart 3D that lists items on the SmartPlant **To Do List**. Click **Tools > Run Report** and open the **Diagnostic** folder; select **Diagnostic 3D To Do List Entries**, and click **Run**. Before running the report, you need to check data consistency on the model database server. For more information, see the *Database Integrity Guide*, available from **Help > Printable Guides**.

 **NOTE** There are other reports in the **Diagnostic** folder such as the **Diagnostic P&ID Correlated 3D Object** that can be used in an integrated environment.

- After retrieving piping and instrumentation data, you can use the colors in the P&ID Viewer to see what objects have been modified or added to the drawing. After retrieving cable data, you can view a cable schedule document.

## Ports

SmartPlant Instrumentation uses physical ports, while SmartPlant P&ID uses logical ports.

When the workflow goes from SmartPlant P&ID to SmartPlant Instrumentation, a Same As relationship is created between the ports in SmartPlant. That Same As relationship is required by Smart 3D to correctly match the design basis ports to the 3D representation of the ports.

When the workflow goes from SmartPlant Instrumentation to SmartPlant P&ID, however, a Same As relationship is not created in SmartPlant. Without this Same As relationship, the result may be additional ports in Smart 3D. The result also depends on the way SmartPlant P&ID and SmartPlant Instrumentation synchronize the retrieval of data.

If Smart 3D retrieves the DDP before it retrieves the P&ID, there could be four ports in the design basis after the P&ID is retrieved. This causes a design basis mismatch in the 3D model. This is commonly referred to as "the four-port issue". After the four port issue has appeared for an instrument in a 3D model, it cannot be resolved. There will always be mismatched items on the **Compare Design Basis** dialog box for the affected instrument.

To avoid the issue, always retrieve the DDP after you have retrieved the P&ID. If you are unable to avoid the issue and it does appear, synchronize SmartPlant Instrumentation and SmartPlant P&ID, and then have SmartPlant Instrumentation republish the DDP. Smart 3D can then re-retrieve the newly republished DDP and this resolves the issue.

## Piping Hierarchy

You can configure the plant breakdown structure (PBS) in the 3D model in two ways:

- Before retrieving P&IDs into the model, retrieve the PBS document to set up the plant/area/unit (PAU) hierarchy. The first three levels of the hierarchy must match between the tools. For more information, see *Retrieving Data* (on page 565) in the *Integration Reference Guide*.
- Configure the PBS directly within the model without retrieving the PBS document. For more information, see *Creating a Plant Breakdown Structure without Retrieving a PBS Document* in the *Integration Reference Guide*.

## Piping Data

If you define a piping hierarchy and route pipe before retrieving piping data on a P&ID, you must correlate the existing runs to runs on the P&ID. Here is an example workflow.

1. Model the pipe run before the P&ID is available.
2. Select the existing pipe run in the 3D model.
3. Click **SmartPlant > Correlate with Design Basis**.
4. Select the corresponding run on the P&ID.
5. On the **Compare Design Basis** dialog box, click **Update**. The software moves the pipe run from its existing parent to its new parent.

 **NOTE** You can browse the **Workspace Explorer** to check the system assignment of the run.

For detailed information on using the Piping task in an integrated environment, see the *Piping User's Guide*.

## Off-Page Connectors (OPCs)

Off-Page Connectors (OPC) connect multi-page P&ID drawings. Unlike other P&ID elements, the OPC is correlated when the two pipe runs are joined. The actual P&ID symbol is never selected or used for correlation. The main issue to take into consideration when correlating piping with an OPC is that a weld is placed where the two pipe runs meet. Therefore, you should find a logical connection point for this weld in the model to avoid adding an additional unneeded weld. For more information on correlating a pipe run that is located on multiple drawings, see the *Piping User's Guide*.

In Smart 3D, when claiming a line that contains an Off-Page Connector (OPC) from a P&ID created prior to SmartPlant P&ID version 4.3, you must claim the OPC at the same time that you claim the line.

## Equipment Data

You correlate and update equipment in the Equipment and Furnishings task.

You must correlate existing equipment using a two-step process. Correlate the equipment body first, and then correlate nozzles separately.

**NOTE** Nozzles correlate at the same time as equipment if they have the same names on the equipment and P&ID.

As with piping, equipment can be built on the fly. For more information about correlating and updating equipment, see the **Correlate Existing Equipment for Use in an Integration Environment** topic in the *Equipment and Furnishings User's Guide*.

## Select Lists (Codelists)

The names of select lists in Smart 3D are case-sensitive. When you make a change to a select list in SmartPlant, you must inspect the Smart 3D Catalog Schema database to verify that the change did not create a duplicate entry. Select list values must have an appropriate value, not a zero as a place holder. A zero value causes an error upon validation of the schema.

## Claiming

Smart 3D provides the ability to exclusively claim objects to a project. Auto-claiming in Smart 3D as a result of claims initiated in SmartPlant P&ID is not supported. Also, SmartPlant P&ID does not support auto-claiming based on claims from other tools. Therefore, you must manually maintain consistent claim scopes between SmartPlant P&ID and Smart 3D.

For example, when objects are shared between tools, the object is typically claimed first in SmartPlant P&ID. In Smart 3D, use **Project > Claim** to claim the correlated object. When Smart 3D claims a correlated object first, SmartPlant P&ID does not auto-claim the object during a retrieve. You must manually claim the object in SmartPlant P&ID.

## Permissions

Intergraph recommends that you or your administrator create a separate permission group for users that perform the retrieve operation. Only users from the retrieve permission group should retrieve documents. Following this recommendation prevents ownership issues related to design basis objects.

Smart 3D requires that you have Write permission in order to claim objects to a project. You are not required to have Write permission to the project to modify claimed objects; you only need

Write permission to the objects themselves. You must also have Write permission to as-built, which must be in a **Working** status to claim and release claims in Smart 3D.

## Workflow for Smart 3D in an Integrated Environment

The following tasks are used when you work with Smart 3D in an integrated environment.

### Register with SmartPlant

Before starting the workflow, an administrator must register the model in the Project Management task. There can be only one registration per model. For more information, see the *Project Management User's Guide* available from **Help > Printable Guides**.

When you register the model, you create a relationship between the local model and the SmartPlant Foundation URL/plant. This operation creates a unique signature for the tool/model combination being registered.

### Define the Workspace and Populate the Work Breakdown Structure

- Define or open a workspace in the software. For more information, see *Define Workspace* (on page 45)
- Populate the WBS, shown on the **WBS** tab in the **Workspace Explorer**. If you are working with a correlated SmartPlant project, you can populate this tab by retrieving a project list. For more information, see *Retrieve Documents* (on page 569). If you are working in as-built, create projects and objects manually using the **Create WBS Project** or **Create WBS Item** commands. For more information, see *WBS Items and Projects* (on page 526).
- Set the active project using the drop-down list on the main toolbar. For more information, see *Select Active Project Dialog Box* (on page 237).

### Retrieve Documents

Retrieve documents such as PBS, P&IDs, and instrument DDPs (Dimensional Data for Piping). The software allows you to retrieve the documents that pertain to the active model only. For more information, see *Retrieve Documents* (on page 569). To retrieve an electrical cable schedule, go to the Electrical task to perform the retrieve. For more information, see the *Electrical User's Guide*.

### Update Retrieved Data

There are several ways to update the retrieved data. For information on any of the commands listed below, see *SmartPlant Menu* (on page 549).

- Use the **View P&ID** command to open a retrieved P&ID. You can view correlated objects (new or changed objects) using the P&ID Viewer. You can view deleted objects using a filter with the **Correlation Status** property.
- Use the **Correlate with Design Basis** and **Compare Design Basis** commands to trace the differences between the P&ID and the 3D model. The **Correlate with Design Basis** command is used to correlate objects previously modeled in Smart 3D to the retrieved P&IDs.
- Use the **View Cable Schedule** command to create and update the retrieved electrical cables in 3D model. For more information, see *View Cable Schedule*.

## Model and Update Objects

Model piping, instrumentation, and equipment objects while using the P&ID as a visual **To Do List**.

## Publish Documents

Create and publish drawings and reports, if necessary. You can also publish 3D model data in the Drawings and Reports task or using the **Tools > Drawing Console** command. For more information, see the Drawings and Reports Help.

**NOTE** After publishing the 3D Model Data, you can view the data in SmartPlant Foundation and SmartPlant Review.

## Back Up the Database

Back up the databases in the Project Management task. For more information, see the *Project Management User's Guide*.

# Publish documents

Before you can publish documents, you must ensure that your computer is configured properly. The configuration includes installing the SmartPlant Client and the SmartPlant Schema Component and registering the model through the SmartPlant Registration Wizard.

You must use the **SmartPlant > Retrieve** command in one of the 3D tasks to import published data.

**★IMPORTANT** When you publish a 3D model, you must now enable the **Scheduler** and **Loader** in SmartPlant Foundation to make the 3D model data document retrievable. The load, consolidate, and merge tasks must complete successfully before the 3D model document can be retrieved.

**NOTE** The **SmartPlant** menu is not available in all tasks.

1. Right-click a component and select **Publish**. The **Publish** dialog box displays.

### **NOTES**

- If the **Publish** command is not available on the shortcut menu for the component or document, check the document properties and make sure that the documents are up-to-date and have been revised first.
- You can use the **Publish > Update and Publish** command to update drawings and publish them in one step. This command is available only if the model is registered with SmartPlant Foundation.

2. Edit information as necessary for the selected documents.

When multiple documents are selected, only property values shared by all of the selected documents display in the table. Changing a value in the table changes that value for all of the selected documents.

3. Select the **Publish Type**.

- Smart 3D supports **Publish Type** for delta publish.

### **NOTES**

- The default setting for **Publish Type** is **Changes Only**. If the 3D model has not been published before, the software automatically selects **All** and performs a complete publish to ensure all filtered data is published and loaded into SmartPlant Foundation.
- For subsequent publishes, select **All** to publish all filtered data in the 3D model, even if it is unchanged. Select **Changes Only** to publish only the changes in the 3D model since the last successful publish.
- If the 3D model does not publish successfully during a delta publish, select **All** so that data from the previous publish is published and loaded into SmartPlant Foundation.
- Other SmartPlant applications do not support **Publish Type**. For these SmartPlant applications, the default setting for **Publish Type** is **All**, and it cannot be changed.

4. Select one of the following operations:

- **Publish** to publish the selected documents immediately.
- **Background publish** to publish as a separate process so that you can continue working in the application.
- **Scheduled publish** to publish in the batch mode by the authoring tool. The documents are not published immediately. Instead, the selected documents are scheduled for publish at a later time and may be scheduled as a recurring operation.

5. Click **OK** to publish the selected documents.

#### **NOTES**

- You can verify the publishing process by starting the SmartPlant Client on your computer and searching for the published document.
- When publish is complete, the following message displays: **Documents have been published successfully**. If the **View Log** button is enabled, messages are available concerning the operation. These messages include errors, warning, and informational messages. Click **View Log** to review these messages.

## **Publish**

Publishes the information in the selected documents. You can access the **Publish Documents** command by right-clicking a component or document.

The **Publish** and **Update and Publish** commands are available for the following types of documents:

- 3D Model Data (SmartPlant Review file type)
- Orthographic Drawings, including Volume and Composed drawings (viewable file with links to data)
- Isogen Isometric Drawings (viewable file with links to data)
- Reports (viewable Microsoft Excel workbook file with links to data)

#### **NOTES**

- The viewable files created when you publish drawings and reports provide relationship links to the 3D Model Data. You must also publish the 3D Model Data to provide the navigation between the viewable files and the 3D Model Data.

- The **Publish > Update and Publish** command updates and then immediately publishes the selected documents in one step. This command is available only if the model is registered with SmartPlant Foundation.

**★ IMPORTANT** When you publish a 3D model, you must now enable the **Scheduler** and **Loader** in SmartPlant Foundation to make the 3D model data document retrievable. The load, consolidate, and merge tasks must complete successfully before the 3D model document can be retrieved.

Define the **Discipline** and **Document Type** properties to enable publishing for the documents. For more information see Set properties for publishing documents.

**NOTE** For 3D model data, the **Discipline** and **Document Type** properties are already populated.

You may also want to specify documents to be revised, not published, or reserve revision numbers. For more information, see Revising.

To generate a list of documents that need to be published, you can use **SmartPlant > Find Documents to Publish**. For more information, see *Find Documents to Publish* (on page 564).

You can publish isometric drawings to SmartPlant Foundation in additional file formats other than the **SHA** drawing file format. These additional files along with the **SHA** drawing are generated by the update process. When publishing isometric drawings you can also publish other available data files and reports generated by the update process. For more information, see Published Files (S3D Supplementary).

*Publish Dialog Box* (on page 559)

## Publish Dialog Box

Provides a list of documents selected to publish.

*Publish Tab (Publish Dialog Box)* (on page 559)

*Issue Request Tab (Publish Dialog Box)* (on page 563)

### See Also

*Publish documents* (on page 557)

*Find Documents to Publish* (on page 564)

*Publish* (on page 558)

## Publish Tab (Publish Dialog Box)

Displays the properties of the selected document or documents. If only one document is selected in the tree view, the properties displayed on this tab are the properties of that one document. If multiple documents are selected, only the properties with the same value for all documents display. Any properties with varying values across the documents display with blank values in these fields.

You can change some of the values assigned to one or more documents by changing the value displayed in the table. The value you type here overrides any existing values for all selected documents.

### Selected documents

Displays a list of the documents selected for publishing. You must populate this list by selecting documents in the **Management Console** or **Detail View** before you use the **Publish** command. For each document, this list displays the name, the type of document,

the workflow from which the document was last published, the revision and version numbers, the revision scheme, and the date when the document was last published.

#### **Engineering Tool**

Opens a dialog box to select documents to add to the **Selected documents** list. This functionality is not available in the current release.

#### **File System**

Opens a standard Microsoft dialog box that allows you to select documents to add to the **Selected documents** list. When you select a file with this **Select File** dialog box, the **Document Properties** dialog box displays, allowing you to specify information about the file, such as whether it is a new file; the category, type, and subtype of the document; and the name, description, and title of the document.

#### **Find**

Opens the **Find Documents to Publish** dialog box, which allows you to search for documents to add to the **Selected documents** list. For more information, see *Find Documents to Publish Dialog Box* (on page 564).

#### **Last Published**

Indicates the date on which the document or documents were last published.

#### **Name**

Displays the name of the document.

#### **Source**

Indicates the authoring tool in which the document was created.

#### **Type**

Displays the type of document or documents selected.

#### **Comment**

Allows you to type information about the selected documents that are publishable.

#### **Issue Only**

Allows you to issue request documents without, necessarily, republishing them. Use this option when no changes were made to a drawing and you only want to add it to a contract.

#### **! TIPS**

- Even with this option set, you can still publish the documents. If any of the documents have never been published, they must be published, regardless of this setting.
- You will receive an error message if you select multiple documents and activate this option when one or more of the selected documents cannot be changed. For example, the error message displays if the selected set of documents includes both a new document (for which this field can be set only to No) and current or locked documents (for which this field can be set only to Yes). The error message prompts you to select a smaller set of documents.

#### **Owning Group**

Select an owning group from the drop down list to which the document belongs.

#### **NOTES**

- By default, the owning group selected for the previous version, if any, is shown.
- All the owning groups configured in SmartPlant Foundation are listed.

#### **Revision**

Displays the current revision number of the selected document or documents.

**TIP** You will receive an error message if you attempt to change the value in this field when you have selected one or more documents that have conflicting revision schemes or different possible revisions. The error message prompts you to select a smaller set of documents.

#### **Revision Scheme**

Displays the revision scheme applied to the selected document or documents.

**NOTE** Only revision schemes that are applicable to the configuration (plant) or classification (document type) are available in the shortcut menu. The revision schemes related to a configuration or classification are not available for any other configurations or classifications. If none of the revision schemes are related to the configuration or classification, then all revision schemes are available unless they are related to any other configuration or classification. For more information on revision scheme configuration, see *Configuring Different Revision Scheme Strategies* in the *How to Configure Document Management* guide.

**TIP** You will receive an error message indicating that this field cannot be edited if one or more of the documents that you have selected are not new or will have a revision scheme supplied by the authoring tool. The error message prompts you to select a smaller set of documents.

#### **Version**

Indicates the current version of the document or documents.

#### **Workflow**

Indicates the workflow to which the selected document or documents are assigned.

#### **Publish Type**

Allows you to publish all data in a 3D model or only the changes to the model since the last successful publish. If the 3D model has not been published before, the software automatically selects **All** and performs a complete publish to ensure all filtered data is published and loaded into SmartPlant Foundation.

<b>Publishing documents</b>	<b>Publish Type</b>	
	All	Changes Only
First publish after creating the document	All objects	All objects
Subsequent publish with no changes to the model	All objects	No objects
Subsequent publish with changes to the model	All objects	Changed objects

Publishing documents	Publish Type	
	All	Changes Only
Subsequent publish with no changes to the model (after changing the Publish Type)	All objects	No objects
Subsequent publish with changes to the model (after changing the Publish Type)	All objects	Changed objects

**! TIP** You will receive an error message indicating that this field cannot be edited if one or more of the documents that you have selected have conflicting sets of possible workflows. The error message prompts you to select a smaller set of documents.

#### Check and publish released claims for previously deleted items

Specifies that you want to resolve issues where deleted items were restored from an earlier version and the claim on them was released. This check takes additional time and should only be used when deleted items have been restored. This option is not supported in this release.

**! TIP** This check box should also be activated when publishing after a backup is restored or when releasing the claim on an object forces another tool to release the claim on a related object that was previously deleted. In this specific case, the tool fetches the object from As-Built again and releases the claim.

#### Operation

Specifies the operation to perform on the selected documents.

- **Publish** - Selected documents are published immediately.
- **Background publish** - Selected documents are published immediately as a separate process, allowing you to perform other tasks at the same time.
- **Scheduled publish** - Selected documents are published in the batch mode by the authoring tool. This option is available only for tools that support batch mode and are processed by the authoring tool, not the SmartPlant Client. The documents are not published immediately. Instead, the selected documents are scheduled for publish at a later time and may be scheduled as a recurring operation.

**! NOTE** If the software cannot make a SmartPlant Foundation server connection when you use **Scheduled Publish**, you are prompted to provide a valid SmartPlant Foundation login and password.

#### Custom

Opens the **Custom** dialog box. This functionality is available only if defined by your project implementation team.

#### Check for deleted objects no longer on documents

Select **Check for deleted objects no longer on documents** option if you want to process the move instructions while publishing.

#### See Also

- Publish documents* (on page 557)
- Find Documents to Publish* (on page 564)
- Publish* (on page 558)

## ***Issue Request Tab (Publish Dialog Box)***

Displays the documents associated with a specific issue request and allows you to add documents to or remove documents from a request.

### **Selected documents**

Displays a list of the documents selected for publishing. You must populate this list by selecting documents in the **Management Console** or **Detail View** before you use the **Publish** command. For each document, this list displays the name, the type of document, the workflow from which the document was last published, the revision and version numbers, the revision scheme, and the date when the document was last published.

### **Engineering Tool**

Opens a dialog box to select documents to add to the **Selected documents** list. This option is not supported in this release.

### **File System**

Opens a standard Microsoft dialog box that allows you to select documents to add to the **Selected documents** list. When you select a file with this **Select File** dialog box, the **Document Properties** dialog box displays, allowing you to specify information about the file, such as whether it is a new file; the category, type, and subtype of the document; and the name, description, and title of the document.

### **Find**

Opens the **Find Documents to Publish** dialog box, which allows you to search for documents to add to the **Selected documents** list.

### **Issue to**

Contains a list of all objects (contracts) that can support issue requests. When you select an item from this list, the names of any documents associated with that object display in the table.

### **Add**

Creates a new item in the table for any documents highlighted in the **Selected documents** tree view.

### **Remove**

Deletes a selected document from the table.

### **Document Name**

Displays the names of all documents associated with the object in the **Issue to** field.

## Find Documents to Publish

Generates a list of documents that either have not been published or have been modified and need to be published again or have been deleted since the last publish. The command is found on the **SmartPlant** menu in the Drawings and Reports task.

**TIP** This command can also be accessed from using the **Find** button on the **Publish** tab of the **Publish** dialog box. For more information, see *Publish Tab (Publish Dialog Box)* (on page 559).

Documents must be up-to-date, and the required **Discipline** property must be defined in order for the documents to be available for publishing. An error message displays if one or more of the documents found by the **Find Documents to Publish** command do not meet this criterion. All items matching the publish criteria continue through the process. For more information on setting the appropriate properties, see Set properties for publishing documents. For more information on updating documents, see Updating Documents.

The **SmartPlant > Find Documents to Publish** command looks for the following:

- Documents created but never published
- Documents modified since their last publish
- Documents deleted after being published

The command looks for documents that need to be republished in the active WBS project. For example, if **Project A** is the active project, the **Find Documents to Publish** command looks for documents in **Project A** only. You set the active WBS project in the **Active Project** box on the main toolbar. For more information, see Manage Projects.

*Find Documents to Publish Dialog Box* (on page 564)

## Find Documents to Publish Dialog Box

Allows you to search for documents that have been updated since they were last published. Additionally, you can use this dialog box to terminate documents that were previously published but no longer exist in the authoring tool. You can access the **Find Documents to Publish** dialog in two ways:

- Select **SmartPlant > Find Documents to Publish**.
- Click **Find** on the **Publish** command dialog box.

### Last Published

Displays the date when the files were last searched. The information displaying in the lists on this dialog box was found on this specified date and time. This option is not available in the current release.

### Update

Displays the Update dialog box, which allows you to define new search criteria for finding documents to publish. This option is not available in the current release.

### Select documents to publish

Displays a list of files that were either updated since they were last published or files that have not yet been published. For each file, this list displays the file name and type, and the date on which the document was last published. If the file has not been published, the **Last Published** field for the document is **New**.

**Select documents to terminate**

Displays a list of the files that were previously published but have since been removed from the project. For each file, this list box displays the file name and type, and the date on which the document was last published.

**Select All**

Selects all of the files in the associated list of documents.

**Clear All**

Clears any selected documents in the associated list.

**See Also**

*Find Documents to Publish* (on page 564)

*Publish Tab (Publish Dialog Box)* (on page 559)

## Retrieving Data

When you retrieve documents in an integrated environment, you are retrieving the document data that was previously published. For example, in SmartPlant Instrumentation, you can retrieve engineering information from a published P&ID into the SmartPlant Instrumentation database.

To retrieve a document, you can use the **SmartPlant > Retrieve** command to open a dialog box that assists you in retrieving the applicable documents.

**NOTE** The **Retrieve** command is available only if you have registered the model using the Project Management task. You must also install the **SmartPlant Client** and **SmartPlant Schema Component** to use the **Retrieve** command.

When you use the **Retrieve** command, the software searches the integrated environment for documents to retrieve, and the **Retrieve** dialog box lists these documents.

You can retrieve a document in the following ways:

- **As published** - Retrieves only the data that the authoring tool originally published with the selected revision and version of the document. Retrieving as-published data retrieves the .XML file that the authoring tool published.
- **With the latest data** - Retrieves the latest data associated with the selected document. If another, more recently published document contains updates to objects in the selected document, then the software retrieves the most current data for those shared objects. When you retrieve the latest data, an .XML file containing the published data is generated.
- **CDW data** - Retrieves the data by updating the property values contained in a published XML with those contained on the corresponding CDW (consolidated warehouse) object.

In Smart 3D, the types of documents and data that you can retrieve include:

- P&IDs
- Project Breakdown documents
- Electrical
- Dimensional Datasheets (DDPs)
- Plant Breakdown Document

 **NOTE** You must have write permissions to the model to use the **Retrieve** command.

### Retrieving P&IDs

You can retrieve piping, instrumentation, and equipment data from a P&ID in an integrated environment.

To use a P&ID in Smart 3D, the piping designer should have defined specific properties on the objects in the P&ID. These properties include fluid code, tag sequence number, piping material class, and nominal piping diameter. In addition, the nozzles should be labeled on the P&ID.

 **NOTE** You should retrieve the SmartPlant Instrumentation data before placing instrumentation in the model.

### Retrieving Electrical Cable Schedules

You can retrieve electrical cable schedule data from SmartPlant Electrical (SPEL). In the Electrical task, the **SmartPlant > View Cable Schedule** command allows you to view the retrieved data and update or import cables.

### Retrieving Instrumentation Datasheets

You can retrieve SmartPlant Instrumentation dimensional data for piping. The software retrieves instruments defined in SmartPlant Instrumentation and maps those instruments to a parametric symbol.

Smart 3D retrieves the non-graphical property values, such as instrument tag, manufacturer, and part number, as well as dimensional group data used to model the instrument.

 **NOTE** You should retrieve the SmartPlant Instrumentation data before placing instrumentation in the model.

### Plant Breakdown Structure (PBS)

You can retrieve the plant breakdown structure (PBS). The PBS is created in and published by SmartPlant Foundation and retrieved to provide information about the models, areas, and units that need to be created in the software.

The PBS document published by SmartPlant Foundation contains information about the physical model whose structure consists of plants, areas, and units. The default structure is plant/area/unit, but you can define a custom hierarchy in the Schema Editor.

For more information, see *Create a Custom PBS Hierarchy* in the *Integration Reference Guide*.

### Data Handling After Retrieval

You can view P&IDs using the **SmartPlant > View P&ID** command to access the data and correlate objects. You can view retrieved electrical cable schedule data with the **SmartPlant > View Cable Schedule** command in the Electrical task.

### Understanding the Design Basis

The 3D design basis is the set of objects in the model database which represent the data from documents previously retrieved from TEF. You do not directly create, edit, or delete these objects. When you correlate a 3D object, a relation is created between that 3D object and its correlated design basis object. For more information, see Design Basis Explanation.

Objects that you retrieve can become the design basis for objects in downstream documents. Objects that become the design basis for other objects can be specific objects that get richer as they move through the lifecycle, or they can be schematic or logical objects in one application that evolve into more detailed objects downstream.

Design basis is implicitly based on retrieval; you do not have to define it. For example, a pump retrieved from a PFD becomes the design basis for a pump in the P&ID.

### Retrieve and Restore

When another application has been restored to a previous state, the Smart 3D design basis objects are deleted and re-created upon retrieval. To avoid duplicating 3D objects, the retrieval process checks systems, pipelines, and projects/contracts to see if they exist with the same name and type as design basis objects. If the objects do exist, then the software correlates to the objects upon retrieval instead of creating new objects.

After the retrieve operation, you must re-correlate the other 3D objects (besides systems, pipelines, and projects/contracts) with the new design basis objects.

### Updating Project Status

When you work in an integrated environment, SmartPlant Foundation (SPF) workflows manage the project status. At each stage in the workflow, you publish your project status information. There are two types of statuses. One is the status on the project: Active, Complete, Merged, or Canceled. The other is the Working/Approved status. Each object in the project has a Working/Approved status, and the project object itself can be set to Working/Approved. The as-built object must always have a Working status. When it becomes Approved, the as-built project becomes read-only.

## Retrieve Command

Provides a list of the published documents that are available for retrieval. This list is displayed on the **Retrieve** dialog box, from which you can select the documents that you want to retrieve, bringing the information from the integrated environment into Smart 3D.

### NOTES

- The **Retrieve** command is available only if you have registered the model using the Project Management task. For more information on registering, see the *Project Management User's Guide*. You must also install the **SmartPlant Client** and **SmartPlant Schema Component** to use the **Retrieve** command. For more information, see the *Intergraph Smart™ 3D Installation Guide* and the *Integration Setup Guide*.
- The **Retrieve** command requires that you have write permissions to the model. Otherwise, error messages are displayed. For example, when you are retrieving the Plant Breakdown Structure (PBS), the command displays an error that says it is unable to create the Plant Breakdown Structure (PBS) systems when retrieving the PBS. For all errors, you have the option of continuing the retrieve process and cleaning up the design basis, or you can cancel the retrieve process and fix the permissions and status, then re-run the **Retrieve** command.

### See Also

*Retrieving Data* (on page 565)

## Retrieve Dialog Box

Allows you to retrieve information published by other authoring tools.

### Plant Breakdown Structure

Displays the plant breakdown structure (PBS) hierarchy to retrieve the corresponding documents. Selecting a node displays the published documents related to that node in the Documents to retrieve section.

In the following examples, the PBS hierarchy is **Plant > Area > Unit**:

- Select a Plant node: All documents which have the relation with the PBS hierarchy (Area/Unit) as well as the documents which do not have relation with the PBS hierarchy (Area,/Unit) are listed in the Documents to retrieve section.
- Select an Area node that has multiple Units: All documents that correspond to the Units in that Area are listed in the Documents to retrieve section.
- Select a Unit node: All documents that correspond to that Unit are listed in the Documents to retrieve section.

 **NOTE** You can expand or collapse the nodes by clicking the + and - icons.

### Document type

Lists the types of documents that you can retrieve. Selecting a document type changes the list view to show only that document type.

### Show

Indicates which documents you want to see in the list. Select from the following options:

**New documents** - Provides a list of only the new documents that have not yet been retrieved.

**New versions of retrieved documents** - Provides a list of only those documents that need to be retrieved. In other words, the list will display the documents that have newer versions published since they were last retrieved.

**Unchanged documents** - Provides a list of documents that have not changed from the previous retrieve.

**Documents of all owning groups** - Provides a list of documents associated with all owning groups. If an owning group is not configured to the user, the documents associated with it are disabled and cannot be retrieved.

### Documents to retrieve

Displays a list of the documents available for retrieval. For each document, this list provides the name, type, PBS parent, revision and version numbers, status, date of the last retrieval, source, owning group, publish comment, publish date and retrieve option. Select the check box beside each document you want to retrieve and then use the Retrieve Option column to specify whether you want to retrieve the document **As published**, **Latest data** or retrieve it with the **CDW data**.

**As Published** - Retrieves only the data that the authoring tool originally published, along with the selected revision and version of the document at the time of publishing. This is the default option.

**Latest data** - Retrieves data by comparing the information in the database with what is in the XML file and will update only the objects that were originally published.

**CDW data** - Retrieves the data by updating the property values contained in a published XML with those contained on the corresponding CDW object.

**💡 TIP** To quickly apply a Retrieve option to multiple documents, point to the cell that you want to select, then click and drag until all the documents are selected. Right-click on the highlighted cells and select Retrieve option to apply the **Latest data, As published** or **CDW data** option. Similarly, you can use the **Select to retrieve** option to select all or clear the selected documents to retrieve.

#### Select All

Selects all the files in the Documents to retrieve section.

#### Clear All

Clears any selected Documents to retrieve section.

#### Batch retrieve

Indicates that the system will retrieve the selected documents in batch mode, in other words, in the background. This feature is not available in the current version of the software.

**⚠ NOTE** Work Breakdown Structure (WBS) documents, such as the Plant Breakdown Structure (PBS) documents are considered administrative documents by the software and must be retrieved by all tools that subscribed to these types of documents. So, even when these documents are new to the tools (have not been retrieved by the tool before), they are still listed in the **Documents to be retrieved only** list, because they must be retrieved.

#### See Also

*Retrieve Documents* (on page 569)

*Retrieving Data* (on page 565)

## Retrieve Documents

1. Click **SmartPlant > Retrieve**. The **Retrieve** dialog box appears.

#### 💡 TIPS

- This command is available only if you have registered the active model using the SmartPlant Registration Wizard. For more information, see the *Project Management User's Guide*. You must also install the **SmartPlant Client** and **SmartPlant Schema Component** to use the **Retrieve** command. For more information, see the *Intergraph Smart™ 3D Installation Guide* and the *Integration Setup Guide*.
- If you are logged on with a user name that is not defined in the integrated environment, you are prompted to log on when you use this command.
- The **Retrieve** command searches the SmartPlant Foundation model for documents that are ready to be retrieved. These documents appear in the **Documents to retrieve** list on the **Retrieve** dialog box.

2. In the **Document type** box, specify the type of document to be retrieved.
3. In the **Show** section, select the appropriate option:
  - **New documents** - Provides a list of only the new documents that have not yet been retrieved.
  - **New versions of retrieved documents** - Provides a list of latest versions of documents published since they were last retrieved.

- **Unchanged documents** - Provides a list of documents that have not changed from the previous retrieve.
- **Documents of all owning groups** - Provides a list of documents associated with all owning groups. If an owning group is not configured to the user, the documents associated with it are disabled and cannot be retrieved.

**! TIP** Select **Documents of all owning groups** option to list the documents associated with all owning groups. If you are configured to the owning group, the documents associated with it are disabled and cannot be retrieved.

4. In the **Documents to retrieve** list, select the check box beside each document that you want to retrieve. To help identify the documents, review the details in the **Type**, **Revision**, **Version**, and **Last Retrieved** columns.
- ! TIP** To quickly select the entire list, click **Select All**. To quickly cancel the selections, click **Clear All**.
5. For each document that you checked, use the **Retrieve Option** column to specify whether you want to retrieve the document with the **Latest data**, **As published** or **CDW data**.

#### **! TIPS**

- Select **As Published** to retrieve only the data that the authoring tool originally published, along with the selected revision and version of the document at the time of publishing.
- Select **Latest Data** to retrieve data by comparing the information in the database with the published XML file and update the objects that were originally published.
- Select **CDW data** to retrieve the data by updating the property values contained in a published XML with those contained on the corresponding CDW object.

6. Click **OK** to retrieve the specified documents.

*The software displays a message box you when the retrieval process is complete.*

7. Click **View Log** to verify error or information messages

OR

Click **Close**.

#### **! NOTE**

- In the Project Management environment, the Deleted and Unclaimed Objects document is retrieved automatically every time you retrieve, if there is a newer version of this document since the last retrieval. The document is not included in the list, but it is retrieved automatically to ensure that the applicable information is updated.

## P&ID Documents

After retrieving, you can use the **View P&ID** command and the **P&ID Viewer** to review data that requires attention. Any items that need to be addressed appear in green, red, and purple in the **P&ID Viewer**. For more information about colors, see *Set Correlation Status Colors Dialog Box* (on page 577).

You can use the **Compare Design Basis** command to see property differences. For example, if you have custom equipment in your model, you may need to modify select list values in the Custom Equipment reference data. You may have to perform routing tasks from the P&ID and

place inline components and instruments. Refer to task-related documentation for assistance in correcting data from the P&ID.

To allow the placement of piping components from a retrieved P&ID, you must specify the value **SmartPlant 3D** for the **Use Piping Specification** property in SmartPlant P&ID Options Manager.

### Electrical Documents

After retrieving, you can use the **View Cable Schedule** command to review and update the cables. For more information, see [View Cable Schedule](#).

#### See Also

[Retrieving Data](#) (on page 565)

## Viewing P&IDs

The **SmartPlant > View P&ID** command allows you to display a P&ID that has been retrieved into the model.

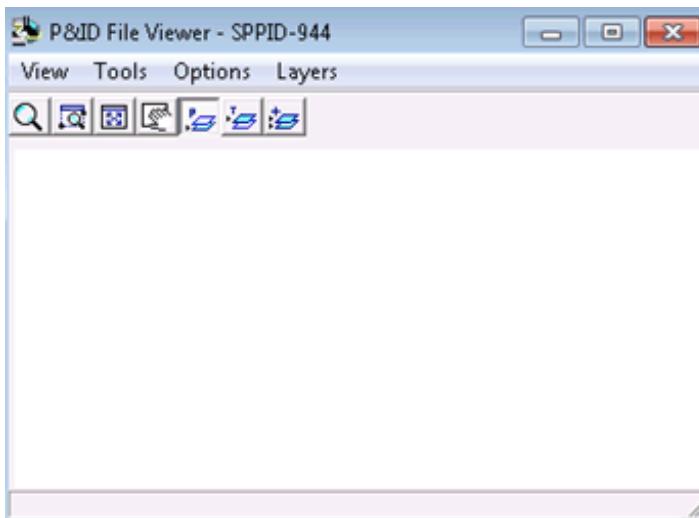
Using a P&ID from the two-dimensional (2D) environment within the three-dimensional (3D) environment is an example of the integration of disciplines. Beyond the display functionality, the software allows you, the designer, to retrieve objects that correlate between the P&ID and the model. This process helps you to create the appropriate 3D design objects.

The P&ID objects you can select and place in the 3D model include pipe runs, equipment, piping components, cables, and instrument components. You can assign 3D objects to Work Breakdown Structure (WBS) projects and later change the assignments to different projects.

In the Piping task, the **Route Pipe** command includes the option **Select from P&ID** to graphically select a run from a P&ID to route. You must set the **Locate Filter** box to **All** or **Pipe Run** before selecting a run from a P&ID. When you select a run on a P&ID, the software checks to see if the run already exists in the model. If the run does exist and is correlated, then the software locates the existing run in the model from the correlated run on the selected P&ID. If the run does not exist, then the **Create New Run** dialog appears, allowing you to create the new run. For most components, you can add them during routing or after routing is complete. Some components, like reducers, must be inserted during routing.

The Equipment and Furnishings task also provides commands that work with placing objects from a P&ID. These commands include the **Place Equipment**, **Place Equipment Component**, **Place Designed Equipment**, **Place Designed Equipment Component**, **Place Shape**, and **Place Nozzle** commands.

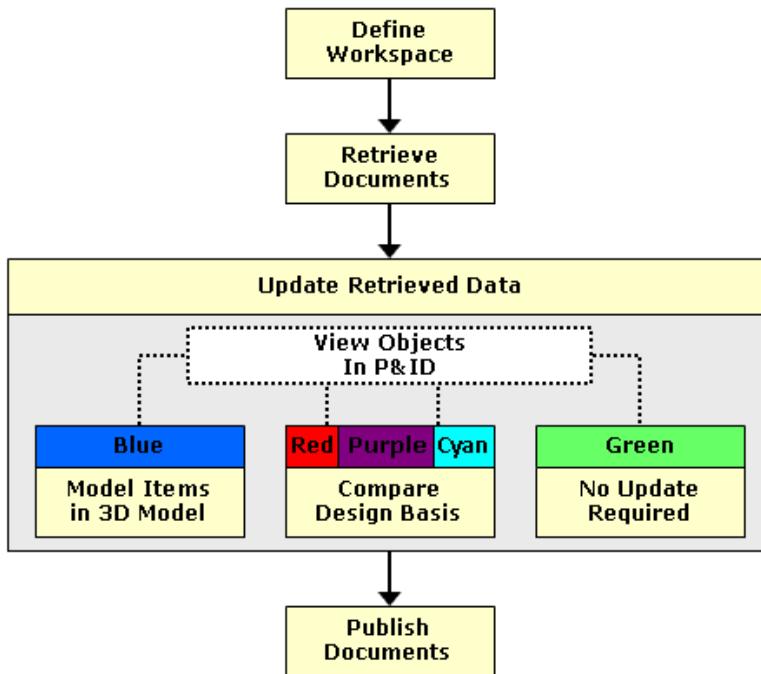
A picture of the **P&ID File Viewer** window appears below. You can resize the window with standard Windows commands on the title bar, like **Minimize**, **Expand**, and **Close**. The window has its own toolbar with viewing commands, such as **Zoom Tool**, **Window Area**, **Fit**, and **Pan**.



The colors of various objects in a P&ID reflect the correlation status between the P&ID and the 3D model. You can consider this a graphical **To Do List** that helps you identify additional work after using the **Retrieve** command. Use the **P&ID Viewer** in conjunction with the **Compare Design Basis** command to see property differences. You can specify the colors using **Options > Set Correlation Status Colors** in the **P&ID File Viewer** menu bar.

The **Select Correlated** command on the **P&ID File Viewer Tools** menu selects 3D objects that match with objects in the P&ID. You can select objects with data match, data mismatch, topology mismatch, and unknown data match. You can also select correlated objects in as-built. The objects must satisfy the parameters of the active locate filter. When you complete a **Select**

**Correlated** command, the software highlights the objects in the 3D view and places them in the select set.



### Handling Deleted Design Basis Issues

Items deleted from the P&ID can be found in the 3D model by updating the objects using the **Compare Design Basis** dialog box or by specifying a filter to select the deleted objects. Any design basis objects that compare with a status of correlated design basis deleted will be deleted when you click **Update** on that dialog box.

You can also use **Fence Select** to update large amounts of data. You set the Select filter to **All**, fence the design objects to update, and then run the **Compare Design Basis** command.

## View P&ID Command

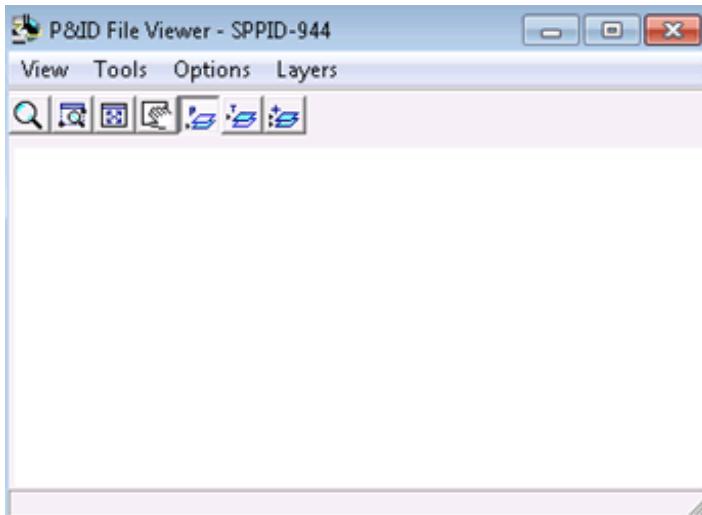
Displays a P&ID that corresponds to the design basis. You can choose the P&ID from a list of P&IDs that have been retrieved.

All P&IDs that have been retrieved into the model appear in this list. If no P&IDs have been retrieved, then this list is empty.

When you select a drawing and click **OK**, the P&ID opens in the **P&ID File Viewer** window.

The software displays the P&ID in the same location and at the same size from the last time that it was displayed in the workspace. You can resize the view with the standard Windows commands on the title bar, like **Minimize**, **Maximize**, and **Cancel**. A toolbar offers view

commands, like **Zoom Out**, **Zoom Area**, **Fit**, and **Pan**. Menus allow you to select correlated objects and specify P&ID colors.



You can use the P&ID to access items, such as equipment, piping information, and SmartPlant Instrumentation dimension data, to help create the appropriate 3D design objects. Also, you can select a correlated object within the model and display the P&ID from which the object was drawn. You can do this by selecting the object in the model and then selecting the **Smart 3D > View P&ID** command. This opens the drawing in which the correlated object exists. If the correlated objects span multiple P&IDs (such as a split equipment), then the software displays a list of P&IDs that you can choose from.

If there is a problem displaying a P&ID or selecting objects on the P&ID, you can consider running a custom command for troubleshooting purposes (this command does not resolve any errors). The ProgID for this command is SP3DDisplayPIDService.VerifyPIDCmd. For more information, see *Verify P&ID Integrity Command* (on page 580).

### See Also

[Viewing P&IDs](#) (on page 571)

## View P&ID Dialog Box

Opens the file that serves as the design basis. All P&IDs that have been retrieved appear in this list. If no P&IDs have been retrieved, then this list is empty. You can sort the list based on any column by clicking a column heading. You can select only one drawing at a time.

This dialog box appears after you select the **SmartPlant > View P&ID** command. When you select a drawing and click **OK**, the P&ID opens in the **P&ID File Viewer** window.

### Drawing Number

Provides the number of the available design basis document.

### Title

Identifies the title of the available design basis document.

### Revision

Indicates the revision number of the document.

### Version Date

Indicates the revision date of the document.

### See Also

*Correlate Model Objects with Design Basis Objects* (on page 587)

## P&ID File Viewer

Displays the P&ID you selected. This window is associated with the **SmartPlant > View P&ID** command.

### Toolbar



#### Zoom Tool

Decreases the display size of selected objects.



#### Window Area

Magnifies an area of the model. Drag or click two points to create a fence around an object or area of the model that you want to enlarge.



#### Fit

Fits all visible objects in the active view.



#### Pan

Moves the view up, down, left, or right to display other areas of the model. The pointer appears as a hand when this command is active.



#### Show Primary View

Displays the primary components only for the P&ID.



#### Show Typicals View

Displays the typicals components only for the P&ID.



#### Show Primary and Typicals

Displays both the primary and typicals components only for the P&ID.

## View Menu

This menu contains the **Fit**, **Zoom In**, **Zoom Out**, **Zoom Area**, and **Pan** commands to assist in orienting the P&ID view.

## Tools Menu

### Magnify

Displays a small zoomed-in view of a portion of the P&ID.

### Overview

Displays a small view of the entire P&ID.

### Select Correlated

Selects the 3D objects that are correlated to the design basis objects. The selection of

objects is based on the locate filter that is currently specified. The **Select Correlated** command highlights the correlated objects in the model and provides a way to quickly see areas where you need to do more work, such as highlighting all objects that have **Data - mismatch**.

**NOTE** Some of these objects may not have corresponding objects on the P&ID (for example, the pipeline object). These commands also select objects regardless of whether the objects are loaded in the current workspace or not. It will not change the workspace definition. These objects can then be manipulated by commands. If they do not match the workspace filter, then they will be removed from the workspace on the next workspace refresh.

The **Select Correlated** command includes the following options: **Correlated - data match**, **Correlated - data mismatch**, **Correlated - topology mismatch**, **Correlated - that are in as-built**, **Approved - topology mismatch**, and **Approved - all mismatches**. For more information about the first three options, see *Set Correlation Status Colors Dialog Box* (on page 577). The **Correlated - that are in as-built** option selects objects in the 3D model that are related to as-built and also are on the currently active P&ID.

## Options Menu

### Set Correlation Status Colors

Specifies the colors of various objects in the P&ID. The colors reflect the correlation status between P&ID objects and the corresponding objects in the 3D model.

### Set Highlight Color

Sets the color of highlighted objects on the P&ID Viewer.

### Set Select Set Color

Sets the color of selected objects on the P&ID Viewer.

## Layer Controls Menu

### Show Typicals

Displays the typicals components in the P&ID File Viewer.

### Hide Primary

Removes the primary components from the P&ID File Viewer. This command appears if the Show Primary command is selected.

### Swap on Highlight

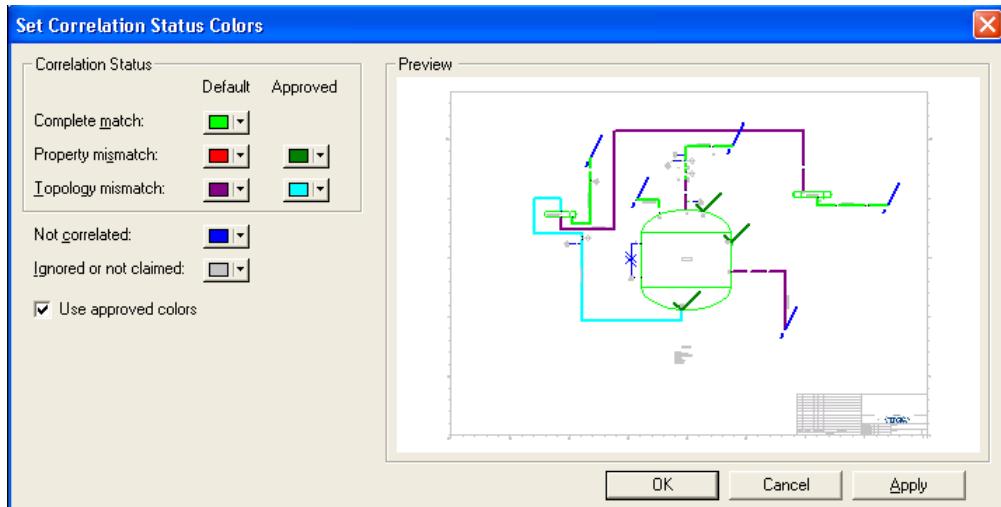
Displays either the primary or typicals components when a correlated 3D object is selected in the model. For example, if the typicals components are hidden and you select a 3D object that is correlated to a typicals object, then the typicals components are displayed and the primary components are removed from the view.

### See Also

*Display a P&ID and Retrieve Drawing Data* (on page 578)

## Set Correlation Status Colors Dialog Box

Specifies the colors that designate correlation status of objects in the design basis with objects in the three-dimensional model. You also specify the standard color for objects in the P&ID that do not have a correlation with any model object.



### Correlated / Complete Match

Designates the color of the objects in the design basis that have a match in the model without any discrepancies in the data or topology. The default color is █.

### Correlated / Property Match / Topology Mismatch

Designates the color of the objects in the design basis that have a match in the model without any discrepancies in the data, but have discrepancies in topology. The default color is █.

### Correlated / Property Mismatch

Designates the color of objects in the design basis that have a match in the model. However, problems exist between the data associated with the design basis (for example, the P&ID object) and model object. The default color is █.

### Correlated/ Property and Topology Mismatch Approved

Designates the color of objects in the design basis that you have compared or checked against the current design basis and approved the discrepancies in the data and topology. The default color is █.

### Correlated / Topology Mismatch Approved

Designates the color of objects in the design basis that you have compared or checked against the current design basis and approved the discrepancies in topology. The default color is █.

### Not correlated

Designates the color of objects in the design basis that do not have a match or do not exist in the model (have not been modeled yet). The default color is █.

### Ignored or not claimed

Designates the color of objects in the design basis that you have drawn but cannot have correlation because you have not placed the objects in the model. **Ignored** applies to things such as labels within the design basis. **Not claimed** applies to items that were not claimed on the P&ID during the Project operation. The default color is .

### Use approved colors

Reveals the designated color of approved objects. For example, if you check this option, the color of the object with approved topology mismatch turns to  from . This option is useful in identifying and verifying the approved mismatches in the design basis.

### Preview

Provides a window that shows the representative colors you selected to identify the correlation status.

### See Also

*Display a P&ID and Retrieve Drawing Data* (on page 578)

## Display a P&ID and Retrieve Drawing Data

1. Select an object in the model.
2. Click **SmartPlant > View P&ID**.
3. If the active object in the model has a match (or a correlated object) in only one P&ID, then the software automatically opens the associated P&ID. If the active object does not match, or has multiple matches in more than one P&ID, then the **Open P&ID File** dialog box opens listing the P&IDs that contain the matching object and allowing you to specify the drawing to open.

 **TIP** Use the document revision number and last revision date to select the correct document.

4. If the **Open P&ID File** dialog box opens, select the P&ID you want to access from the list of all P&IDs that have been imported. The **P&ID File Viewer: [drawing name]** window opens and displays the drawing.
5.  **TIP** The grid on the **P&ID File Viewer: [drawing name]** window states the name and description of the P&ID.
6. When the P&ID opens in the **P&ID File Viewer: [drawing name]** window, use the various commands in the P&ID File Viewer to orient the drawing, select correlated objects, and specify colors.
7. Select objects in the P&ID and use commands in the 3D software to create or edit these objects in the model.
8. To close the **P&ID File Viewer: [drawing name]** window, click **Close** on the title bar.
9. To open a different drawing, start the **SmartPlant > View P&ID** command again.

### NOTES

- You can use the P&ID that the software displays in the **P&ID File Viewer** window as a reference when you model objects and thus create the appropriate 3D design objects.
- Among P&ID objects that you can select are a pipe run, equipment, cable, piping component, instrument component, branch point, and an attribute break point. Piping

components and instrument components result in along-leg features in the 3D model. A branch point results in a branch feature in 3D, and an attribute break point results in a run change feature in 3D.

- If there is a problem displaying a P&ID or selecting objects on the P&ID, then you can consider running a custom command for troubleshooting purposes (this command does not resolve any errors). The ProgID for this command is SP3DDisplayPIDService.VerifyPIDCmd.

## ***Viewing and Correlating P&ID Typicals***

In Smart 3D, you can now view a P&ID's typicals and correlate these with your model. Within a P&ID drawing, typicals are user defined, graphical representation, of a group of objects and their relationships. On a P&ID drawing, typicals mark the position of where similar groups of objects should appear but have been hidden from view. For example, on a drawing typicals that contain a series of pipes, a pump, and valves, informs the viewer that at this position on the drawing there is more than one group of objects that consist of a series of pipes, a pump, and valves, but have been hidden from view to make the reading of the drawing clearer.

By default, typicals are hidden when you view the P&ID using the **View P&ID** command. To know exactly what the hidden objects are the viewer needs to switch views, from the primary view to the typicals view. **Layer Control** commands allow you to switch show and hide typicals, show and hide primary, and switch between primary and typicals views when a 3D object is highlighted.

### ***View and Correlate P&ID Typical***

1. Click **SmartPlant > View P&ID**.
2. Select a P&ID from the drawing list in the **Open P&ID File** dialog box. By default, the viewer opens displaying primary P&ID components.
3. Click  to view the primary components.
4. Click  to select the typicals view.
5. To display both primary and typicals, click .

 **NOTE** You can use the **Layer Control** commands to show and hide the P&ID's primary or typicals components.

6. To automatically switch between displaying primary and typicals components when a 3D object is selected, click **Layer Control > Swap on Highlight**. If both the primary and typicals views are displayed, then no switching between views occurs.

 **NOTE** Using the **Piping** control on the main ribbon, select **All** before selecting the 3D Objects

7. To correlate, see *Correlate with Design Basis Command* (on page 583) or *Correlate Automatically Command* (on page 590).

## Assign Colors for Correlation

1. Click **Smart 3D > View P&ID**. If an active (or selected) object in the model has a design basis match (or a correlated object) in only one P&ID, then the software automatically opens the associated P&ID. If the active object does not match or has multiple matches in more than one P&ID, then the **Open P&ID View** dialog box opens with the list of P&IDs with a match for that object.
2. When the **Open P&ID View** dialog box opens, select the P&ID you want to access from the list of all imported P&IDs. The **P&ID File Viewer: [drawing name]** window opens and displays the drawing.
3. On the **P&ID File Viewer: [drawing name]** window, click **Options > Set Correlation Status Colors**.
4. On the **Set Correlation Status Colors** dialog box, select a color for specifying objects with correlation and without any errors in the **Correlation Status section, complete** match box.
5. Select a color for specifying objects with correlation but have property inconsistencies in the **Correlation Status section, Property mismatch** box.
6. Select a color for objects you have approved with data mismatches in the **Correlation Status section, approved property mismatch** box.
7. Select a color for object you have approved with association problems in the **Correlation Status section, Topology mismatch** box.
8. Select a color for objects you have approved with topology mismatches in the **Correlation Status section, approved topology mismatch** box.
9. Select a color for objects that cannot be correlated or are not claimed in the project in the **Ignored or not claimed** box.
10. Select a color for specifying objects that have not been drawn or are drawn in the model but not correlated in the **Not Correlated** box.

**NOTE** You can review the selected colors in the **Preview** area by clicking **Apply**.

### See Also

[Viewing P&IDs \(on page 571\)](#)

## Verify P&ID Integrity Command

Validates the internal connections between objects on a P&ID and objects in the Model database. This command is a custom command (ProgID: SP3DDisplayPIDService.VerifyPIDCmd) and provides some basic troubleshooting statistics. It does not resolve database integrity errors. For more information about database integrity, see the *Database Integrity Guide* available from the **Help > Printable Guides** command in the software.

The **Verify P&ID Integrity** command displays the following information:

- Design Basis Objects: The total number of design basis objects that have a relationship to the P&ID document object. The number should be the same as what is seen in the P&ID Viewer.
- 3D Objects: The number of design basis objects that have a correlated relationship between the P&ID document and the Smart 3D object. The current correlation status is also reported.

- P&ID Objects (Total Identified): This count is the total number of RAD objects that have a drawing ID in the P&ID document. The total identified should match the number of Design Basis Objects. These objects are displayed with their representation ID.
- P&ID Objects (contained in Design Basis): The number of RAD objects that have a graphic OID that will map to drawing representation design basis objects. This number should match the Design Basis Object count. A mismatch most likely means that the objects were deleted. The difference is the number of Deleted P&ID OIDs.
- Deleted P&ID OIDs: The number of RAD objects that have a graphic OID but do not exist in the model.
- Duplicate OIDs: The number of multiple RAD objects with the same graphic OID. Most likely, there is a problem with the P&ID file or with the integrated environment.
- Miscellaneous Errors - Any errors not defined above are in this category.

### See Also

[Validate Connections between P&ID and 3D Objects \(on page 582\)](#)  
[Viewing P&IDs \(on page 571\)](#)

### Verify P&ID Integrity Dialog Box

Allows you to select a P&ID to verify, and displays the results of the process.

#### Select P&ID

Lists the P&IDs that you can verify. You can select only one P&ID at a time to validate.

#### Verify

Click this button to start the verification process. The software displays the following items:

- Design Basis Objects: The total number of design basis objects that have a relationship to the P&ID document object. The number should be the same as what is seen in the P&ID Viewer.
- 3D Objects: The number of design basis objects that have a correlated relationship between the P&ID document and the Smart 3D object. The current correlation status is also reported.
- P&ID Objects (Total Identified): This count is the total number of RAD objects that have a drawing ID in the P&ID document. The total identified should match the number of Design Basis Objects. These objects are displayed with their representation ID.
- P&ID Objects (contained in Design Basis): The number of RAD objects that have a graphic OID that will map to drawing representation design basis objects. This number should match the Design Basis Object count. A mismatch most likely means that the objects were deleted. The difference is the number of Deleted P&ID OIDs.
- Deleted P&ID OIDs: The number of RAD objects that have a graphic OID but do not exist in the model.
- Duplicate OIDs: The number of multiple RAD objects with the same graphic OID. Most likely, there is a problem with the P&ID file or with the integrated environment.
- Miscellaneous Errors - Any errors not defined above are in this category.

#### Results

Lists the verification criteria (P&ID objects, 3D objects, and so forth) and the counts

associated with each criterion.

#### Details

Displays a list of the objects with the selected error. For more information, see *Details Dialog Box* (on page 582).

#### Close

Closes the dialog box. This command does not save any data.

#### See Also

*Validate Connections between P&ID and 3D Objects* (on page 582)

*Verify P&ID Integrity Command* (on page 580)

*Viewing P&IDs* (on page 571)

### **Details Dialog Box**

Lists the objects with the error condition you selected on the **Verify P&ID Integrity** dialog box.

#### P&ID

Lists P&ID objects.

#### 3D Model

Lists the corresponding 3D model object.

#### Correlation Status

Shows the correlation status between the P&ID object and 3D object.

#### Notes

Displays any notes.

#### Close

Closes the dialog box and returns you to the **View P&ID Integrity** dialog box.

#### See Also

*Verify P&ID Integrity Dialog Box* (on page 581)

### **Validate Connections between P&ID and 3D Objects**

1. Click **Tools > Custom Commands**.
2. Add the **SP3DDisplayPIDService.VerifyPIDCmd** command, and run it.
3. On the dialog box, select a single P&ID to verify.
4. Click **Verify**.
5. To view additional statistics about any result, click a row in the **Results** box, and then click **Details**.

**TIP** You can select an object (only select one) in the **Details** list and see it highlight in the select color on the P&ID.

#### See Also

*Viewing P&IDs* (on page 571)

## Publishing 3D Data

You can publish 3D model data in the Drawings and Reports task or using the **Tools > Drawing Console** command. The model can then be viewed through SmartPlant Foundation or SmartPlant Review. For more information, refer to the Drawings and Reports Help.

## Correlate with Design Basis Command

Specifies an object in the three-dimensional model and an object in a P&ID to correlate. A P&ID pipe run can correlate with multiple Smart 3D pipe runs. A P&ID pipeline can correlate with multiple Smart 3D pipelines.

If the objects do not have a status of **Correlated with data match**, you can trace the origin of the problem using the **Compare Design Basis** dialog box.

You can add conditions to the *[Reference Data Folder]\SharedContent\Xml\ExemptCorrelateClasses.xml* file that cause the Correlation Basis of an object to be set to **Ignored** when that object meets the conditions. The data in the `<IgnoreObjects>` xml tag is used to list conditions to determine if an object should be ignored for a P&ID topology comparison. Valid values for the Operator attribute in the `<Condition>` tag are `=` for equality and `!=` for inequality. For example:

```
<IgnoreObjects>
  <Condition>
    <Property Interface = "IJRtePipePathFeat"
      Name = "Type" Value = "Nipple" Operator = "=" />
  </Condition>
</IgnoreObjects>
```

You can change the correlation colors by clicking **Tools > Set Correlation Status Colors** in the **P&ID File Viewer**.

Default Color	Status	Description
	<b>Complete match</b>	Represents objects that have a data and topology match between the design basis data and the objects in the three-dimensional model.
	<b>Correlated with property mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have a property discrepancy which generates the mismatch. The cause of the discrepancy can result from changes in the P&ID or in the three-dimensional model.
	<b>Correlated with Topology mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have a topology discrepancy which generates the mismatch.

Default Color	Status	Description
	<b>Correlated with approved property mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have approved property discrepancies.
	<b>Correlated with approved topology mismatch</b>	Represents objects that have a correlation with the design basis. However, these objects have an approved topology discrepancies.
	<b>Not correlated yet</b>	Objects that have either not been modeled from the P&ID or that have been modeled but have not been correlated with design basis data.
	<b>Ignored or not claimed</b>	Shows the object either is not claimed (that is, it exists in the as-built condition), or the software ignores the object (for example, revision clouds and labels).

### See Also

[Retrieving Data \(on page 565\)](#)

## Correlate with Design Basis Dialog Box

Correlates the selected object in the 3D model to a matching design object on the P&ID. If the objects do not have a status of **Correlated complete match**, you can trace the origin of the problem using the **Compare Design Basis** dialog box.

### See Also

[Correlate with Design Basis Command \(on page 583\)](#)

[Correlate Model Objects with Design Basis Objects \(on page 587\)](#)

[Properties Tab \(Correlate with Design Basis Dialog Box\) \(on page 584\)](#)

[Topology Tab \(Correlate with Design Basis Dialog Box\) \(on page 586\)](#)

## Properties Tab (Correlate with Design Basis Dialog Box)

### Selected

Specifies the name of the selected object in the 3D model.

**NOTE** A P&ID pipe run can correlate with multiple Smart 3D pipe runs. A P&ID pipeline can correlate with multiple Smart 3D pipelines. The **Selected** drop-down lists all objects in the 3D model that are correlated with the design basis object.

### Category

Specifies the category for the property. Properties are listed in alphabetical order according to the interface of the category that you selected for the property pages of the 3D model.

The read-only field beside the **Category** box provides the following information about the correlation for the object that you selected in the 3D model:

- **Property Match** - Indicates that the object that you selected in the model has all properties matching those of its correlated design basis object.

- **Property Mismatch** - Indicates that the object that you selected in the model has one or more properties with values not matching the value of the mapped property in the correlated object.
- The check box beside the **Model Property Name** allows you to selectively update the properties in the list. You must select **Copy properties from design basis** to enable the selective update check boxes.
  - - Indicates clear or disabled state. Selective update is disabled or none of the properties are selected for update.
  - - Indicates that all the properties in the list are selected for update.
  - - Indicates that one or more properties in the list are not selected for update.
  - - Indicates read-only. You cannot update this property.

### NOTES

- You must check the selective update check box of the corresponding property to set its correlation status to **Property Match**.
- The software remembers the last saved selective update preference for an object type such as a pipe run, equipment, and pipeline system. For example, if you do not want to update **Name** for piperun1, clear the checkbox corresponding to **Name**, and then click **Update**. When you correlate piperun2, the dialog box displays your preference from the piperun1 you last correlated.

#### **Model Property Name**

Specifies the name of the property for the model object.

#### **Design Basis Value**

Specifies the value of the property for the design basis object.

#### **Model Value**

Specifies the value of the property for the 3D model object.

#### **Copy properties from design basis**

Controls copying of properties from the design basis object to the 3D model object. Select this option to update 3D object properties during manual correlation. Unchecking this option clears and disables all the selective update check boxes.

 **NOTE** This option allows you to update the approval status of a property without updating it in **Compare Design Basis** dialog box.

#### **Update**

Correlates the 3D object with design basis object; if the **Copy properties from design basis** option is selected, transfers data from the design basis object (in the P&ID, for example) to match the 3D model object. Clicking **Update** changes all of the property values.

#### **Close**

Closes the **Correlate with Design Basis** dialog box.

## Topology Tab (Correlate with Design Basis Dialog Box)

Displays the child objects of the selected grouping object and indicates both the 3D objects not correlated to the P&ID (design basis) and also the P&ID objects (design basis) not correlated to 3D objects. For example, when you select a pipe run, the **Topology** tab indicates objects that are correlated and in the same order on the pipe run, as well as objects that are correlated and not in the same order on the pipe run.

**NOTE** This tab is available only for those objects that support correlation and get topology from the design basis.

### Selected

Displays the name of the selected object in the 3D model.

The read-only field provides the following information about the correlation for the object you selected in the 3D model:

- **Topology Match** - Indicates that the object in the model you selected has a match or correlation with an object in the design basis.
- **Topology Mismatch** - Indicates that the object in the model you selected does not have a match or correlation with an object in the design basis.

### #

Indicates an index number to reference the object as defined in the design basis (that is, the drawing).

### Design Basis Name

States the name of the object in the design basis (for example, a pipe run).

### Model Name

States the name of the object in the 3D model.

### Select

Selects a row in the grid. The object highlights in the model.

### Close

Closes the **Compare with Design Basis** dialog box.

**NOTE** If a discrepancy exists on the **Topology** tab after clicking **Update** on the **Properties** tab, you can trace the discrepancy and attempt to resolve it. For example, a discrepancy might be an object routed or placed out of order.

### See Also

*Compare Design Basis with the Model* (on page 598)

*Compare with Design Basis Dialog Box* (on page 596)

## Correlate Model Objects with Design Basis Objects

**NOTE** A P&ID pipe run can correlate with multiple Smart 3D pipe runs. A P&ID pipeline can correlate with multiple Smart 3D pipelines.

1. Click **SmartPlant > Retrieve** to retrieve data into the software (for example, a P&ID or a Dimensional Datasheet).
2. Click **SmartPlant > Correlate with Design Basis**.
3. Select an object in the 3D model that you want to correlate. If you do not have a P&ID open, the software displays the **Open P&ID** dialog box.

**NOTE** If you are correlating pipelines, ensure to set the filter to **Pipelines**; likewise, for pipe runs, set the filter to **Piping Runs**. This is because you cannot select pipelines in P&ID and the software uses the filter to determine what kind of piping objects you are correlating.

4. Select the P&ID to display.
5. In the **P&ID File Viewer**, select the object that you want to correlate. The software then displays the **Correlate with Design Basis** dialog box. If one of the following conditions exist, then a message first displays.
  - a. The 3D object supports one-to-many correlation, and the P&ID object is already correlated to one or more 3D objects. The following message displays:  
*Selected Design Basis object is already correlated to another 3D object. Are you sure you want to correlate more than one 3D object the same Design Basis object?*  
Click **Yes** to continue.  
-OR-  
Click **No** to display the **Compare Design Basis** dialog box, and proceed to step 6.  
-OR-  
Click **Cancel** to exit and cancel the correlation.
  - b. The 3D object does not support one-to-many correlation, and the corresponding P&ID object and 3D object correlation already exists. The following message is displayed:  
*You are trying to correlate to the same object again.*  
Click **Ok** to display the **Compare Design Basis** dialog box with the correlation objects highlighted. Proceed to step 6.  
-OR-  
Click **Cancel** to exit and cancel the correlation.
  - c. The 3D object does not support one-to-many correlation, and the corresponding P&ID or 3D object are already correlated. The following message displays:  
*You are trying to correlate to an object that is already correlated. Would you like to remove the existing correlation and correlate again?*  
Click **Yes** to remove the existing correlation and correlate the selected objects. After the new correlation, the software displays the **Compare Design Basis** dialog box with the newly correlated objects highlighted. Proceed to step 6.  
-OR-

Click **No** to display the **Compare Design Basis** dialog basis with the correlated objects. Proceed to step 6.

-OR-

Click **Cancel** to exit and cancel the correlation.

6. Review the **Properties** tab for highlighted objects that have a discrepancy between the P&ID and the 3D model. Objects that do not match are displayed in a different background color.
7. Review the **Topology** tab to understand the differences in shapes between the 3D model and the design basis.
8. Select **Copy properties from design basis** if you want to update the 3D object properties. Clear this option to prevent overwriting the 3D object properties from design basis.
9. Click **Update** to correlate the 3D object with design basis object.

**NOTE** You can also select the **Correlate with Design Basis** command after activating a model object, a design basis object, or both types of objects. If you select an object before starting the command, follow the prompts on the status bar at the lower left of the application window.

## Manually Correlate Multiple Smart 3D Pipe Runs/Pipelines with a P&ID Pipe Run/Pipeline

If a P&ID pipe run or pipeline is split into multiple pipe runs or pipelines in Smart 3D, you can use the following procedure to manually correlate these multiple Smart 3D piping objects to the single P&ID pipe run or pipeline.

**NOTE** If you are correlating pipelines, ensure to set the filter to **Pipelines**; likewise, for pipe runs, set the filter to **Piping Runs**. This is because you cannot select pipelines in P&ID and the software uses the filter to determine what kind of piping objects you are correlating.

1. Click **SmartPlant > Retrieve** to retrieve P&ID data into the software.
2. Open the P&ID in the **P&ID File Viewer**.
3. Click **SmartPlant > Correlate with Design Basis**.
4. Select an object in the 3D model that you want to correlate.
5. In the **P&ID File Viewer**, select the object that you want to correlate.

The software detects whether the P&ID object is already correlated to one or more 3D object. When you see the following message, click **Yes** to continue.

*Selected Design Basis object is already correlated to another 3D object. Are you sure you want to correlate more than one 3D object the same Design Basis object?*

**NOTE** If you click **No**, the software un-correlates the existing correlated run, and then correlates the new run.

6. Review the **Correlate with Design Basis** dialog box, set correlating options as needed, and click **Update**.
7. Review discrepancies between the Smart 3D piping object and the design basis using the **SmartPlant > Compare Design Basis** command.

**TIP** The **Compare Design Basis** command helps you to determine if there are missing correlations to the P&ID piping object.

8. Repeat steps 3 through 6 to correlate more Smart 3D objects to the P&ID piping object. When all related objects in the 3D model are correlated with the P&ID piping object, the **Correlation Status** property of these 3D objects shows **Correlated with data consistency**.

## Create a Filter to Select Piping Components Based on Correlation Status

1. Click **Tools > Select by Filter**.
2. On the **Select Filter** dialog box, click **New Filter (Simple or Asking)** .
3. On the **New Filter Properties** dialog box, select the **Properties** tab.
4. Select **More** in the **Property** box.
5. Select **Pipe Nozzle** as the object type.
6. Select **Direct Property of Object Type** as the relationship.
7. Select **Standard** as the category.
8. Select the **Correlation Status** attribute, and click **OK**.
9. On the **New Filter Properties** dialog box, select an operator and a value. For example, you can specify that the filter select piping components with a correlation status equal to **Correlated with Data Consistency**.

### NOTES

- The filter capability provides a means to query all piping objects based on their correlation status with one operation.
- In addition to the filter for piping components, you can create a filter to select all pipes with a specific correlation status. For more information, see *Create a Filter to Select Pipes Based on Correlation Status* (on page 589).

## Create a Filter to Select Pipes Based on Correlation Status

1. Click **Tools > Select by Filter**.
2. On the **Select Filter** dialog box, click **New Filter (Simple or Asking)** .
3. On the **New Filter Properties** dialog box, select the **Properties** tab.
4. Select **More** in the **Property** box.
5. Select **Piping** as the object type.
6. Select **Run to Part-Owner** as the relationship.
7. Select **Piping Runs** as the related object type.
8. Select **Standard** as the category.
9. Select the **Correlation Status** attribute, and click **OK**.

- On the **New Filter Properties** dialog box, select an operator and a value. For example, you can specify that the filter select piping components with a correlation status equal to **Correlated with Data Consistency**.

#### NOTES

- The filter capability provides a means to query all piping objects based on their correlation status with one operation.
- In addition to the filter for pipes, you can create a filter to select all piping components with a specific correlation status. For more information, see *Create a Filter to Select Piping Components Based on Correlation Status* (on page 589).

## Correlate Automatically Command

Automatically correlates 3D objects with the design basis objects on the P&IDs based on the matching properties and topology.

There are several reasons why the data in the 3D model might be current than the data in the P&ID. For example, the model might exist before the P&ID, and you now want to correlate the existing model data to the P&ID data that you have retrieved.

#### NOTES

- If no 3D objects are selected, then the command runs the correlations for all selected P&ID drawings against all 3D objects in the workspace.
- Nozzles are correlated automatically when the parent equipment is correlated.
- You can correlate one P&ID pipeline to many 3D pipelines. You can also correlate one P&ID pipe run to many 3D pipe runs.

## Correlate Automatically Dialog Box

Lists all of the retrieved P&IDs in the 3D model that can be used for correlation. You can use CTRL + Select and SHIFT + Select to select multiple drawings to correlate. You can sort the drawings by clicking on the column headers, and filter using the **[Custom Filter]** option.

**Name** - Displays the name of the P&ID. Click , and select the P&ID name from the list to filter.

- [All]** - Displays all the available P&IDs. This option is selected by default.
- [Custom Filter]** - Allows you to customize the object filtering. Displays **AutoCorrelate Custom Filter** when you select this option. To filter, type the exact P&ID name, or type \* and % special characters as the first or last characters in the **AutoCorrelate Custom Filter** box.

**RevNumber** - Displays the number of times the P&ID is reviewed. Click , and select the revision number from the list to filter.

- [All]** - Displays all the available P&IDs. This option is selected by default.
- [Custom Filter]** - Allows you to customize the object filtering. Displays **AutoCorrelate Custom Filter** when you select this option. To filter, type the exact number in the **AutoCorrelate Custom Filter** box.

**RevDate** - Displays the date (YYYYMMDD) that the P&ID is reviewed. Click , and select the date from the list to filter.

- **[All]** - Displays all the available P&IDs. This option is selected by default.
- **[Custom Filter]** - Allows you to customize the object filtering. Displays **AutoCorrelate Custom Filter** when you select this option. To filter, type the exact date in the **AutoCorrelate Custom Filter** box.

**Parent** - Displays the name of the parent to which the P&ID belongs. Click , and select the parent from the list to filter.

- **[All]** - Displays all the available P&IDs. This option is selected by default.
- **[Custom Filter]** - Allows you to customize the object filtering. Displays **AutoCorrelate Custom Filter** when you select this option. To filter, type the exact parent name or type \* and % special characters as the first or last characters in the **AutoCorrelate Custom Filter** box.

**Copy properties from design basis** - Copies properties from the design basis objects to the corresponding 3D objects. This option is not selected by default. Changes made to this option are saved to the session file.

**⚠ CAUTION** Selecting this option overwrites the 3D object properties with the corresponding correlated design basis object values. Therefore, do not select this option if you do not want to modify the properties of a 3D object.

**>Note** Changes made to this option are applied to all the commands that use it. For example, if you select this option in the **Correlate Automatically** dialog box, then this option is also selected in the **Correlate with Design Basis** and **Compare with Design Basis** dialog boxes.

### See Also

*Automatically Correlate with the 3D Model* (on page 591)

*Correlate Automatically Command* (on page 590)

## Automatically Correlate with the 3D Model

1. Select only equipment objects in the model by clicking them in a graphic view, dragging a fence around objects, or selecting by filter.

**Note** If no 3D objects are selected, then the software runs the correlation for all selected P&IDs against all 3D objects in the workspace.

2. Select **SmartPlant > Correlate Automatically**.

The **Correlate Automatically** dialog box displays.

3. Select one or more P&IDs from the design basis to correlate.

**⚠ CAUTION** We recommend that you correlate 3D objects that belong to the selected P&ID.

**Note** Verify that the **Copy properties from design basis** check box is clear.

4. Click **OK**.

If the property match rules are met, then the software correlates all equipment and piping nozzles in the P&ID. The **Auto-correlate Report** is displayed after the auto-correlation process is complete. For more information on the auto correlation report, see *Auto-Correlate Report* (on page 592).

5. Resolve any ambiguities in the Auto-Correlate Report:

- a. On the **Auto-Correlate Report > Ambiguous Objects**, click the 3D object to correlate.  
*The selected 3D object is highlighted and zoomed to in the active view.*
- b. Select the appropriate P&ID object to be correlated from the list of possible matches.  
*The selected design basis object is highlighted yellow in the P&ID Viewer.*
- c. On the **Auto-Correlate Report**, click **Correlate**.

**?** **TIP** Perform these steps until all the ambiguities are resolved.

6. Select only pipeline objects within the workspace, and repeat steps **1** to **4**.  
*If all auto-correlation rules are met, then the software correlates all pipelines, pipe runs, and piping components in the P&ID.*
7. Repeat step **5**.
8. Click **Cancel** to close the report.

### NOTES

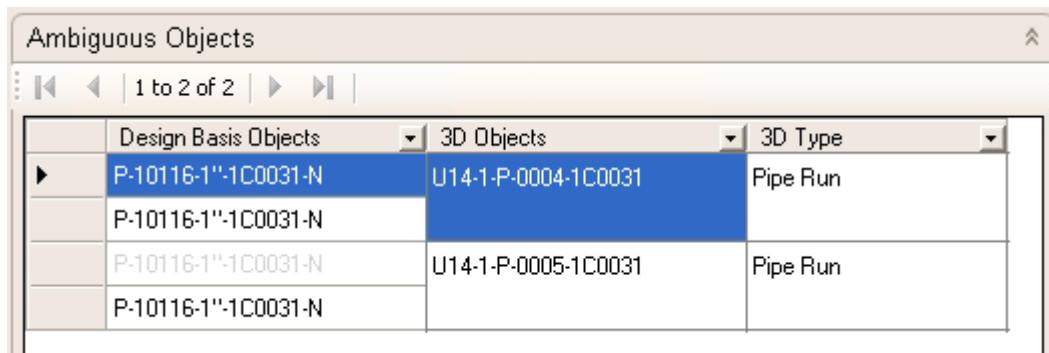
- The log file is stored in the temporary folder of your Documents and Settings folder.
- The software ignores objects that are already correlated in the 3D model.

## Auto-Correlate Report

This report is divided into three sections that allow you to review and resolve any correlation discrepancies. You can edit 3D objects, 3D object properties, compare with design basis, manually correlate, and review your edits in the auto-correlate report while it is open.

### Ambiguous Objects

This section contains a list of 3D objects with one or more possible matching design basis objects.



The screenshot shows a table titled "Ambiguous Objects" with three columns: "Design Basis Objects", "3D Objects", and "3D Type". The table has four rows. The first row is highlighted in blue, indicating it is selected. The second row is also highlighted in blue. The third and fourth rows are greyed out. The "Design Basis Objects" column contains "P-10116-1"-1C0031-N, "P-10116-1"-1C0031-N, "P-10116-1"-1C0031-N, and "P-10116-1"-1C0031-N respectively. The "3D Objects" column contains "U14-1-P-0004-1C0031", "U14-1-P-0005-1C0031", and two empty cells. The "3D Type" column contains "Pipe Run" for the first two rows and empty cells for the last two. Navigation buttons at the top left indicate "1 to 2 of 2".

	Design Basis Objects	3D Objects	3D Type
▶	P-10116-1"-1C0031-N	U14-1-P-0004-1C0031	Pipe Run
	P-10116-1"-1C0031-N		
	P-10116-1"-1C0031-N	U14-1-P-0005-1C0031	Pipe Run
	P-10116-1"-1C0031-N		

**Design Basis Objects** - Displays the name of the ambiguous design basis object. Click **[▼]**, and select the 3D object from the list to filter ambiguous objects based on the 3D object.

- **[All]** - Displays all the objects. This option is selected by default.
- **[Custom Filter]** - Allows you to customize the object filtering. Displays **AutoCorrelate Custom Filter** when you select this option. To filter, type the exact object name, or type \* and % special characters as the first or last characters in the **AutoCorrelate Custom Filter** box.

**3D Objects** - Displays the name of the 3D object. Click , and select the 3D object from the list to filter ambiguous objects based on the 3D object.

- **[All]** - Displays all the objects. This option is selected by default.
- **[Custom Filter]** - Allows you to customize the object filtering. Displays **AutoCorrelate Custom Filter** when you select this option. To filter, type the exact object name, or type \* and % special characters as the first or last characters in the **AutoCorrelate Custom Filter** box.

**3D Type** - Displays the object type. Click , and select the object type from the list to filter ambiguous objects based on the object type.

- **[All]** - Displays all the objects. This option is selected by default.
- **[Custom Filter]** - Allows you to customize the object filtering. Displays **AutoCorrelate Custom Filter** when you select this option. To filter, type the exact object name, or type \* and % special characters as the first or last characters in the **AutoCorrelate Custom Filter** box.

 **NOTE** A 3D object can have one or more design basis objects listed as possible match, when the design basis objects have matching properties with the 3D object.

## Not Correlated Objects

This section contains a list of 3D objects that are not correlated with any design basis objects.

Not Correlated Objects			
	Design Basis Objects	3D Objects	3D Type
▶		STFndPort1	Foundation Port
		STFndPort1	Foundation Port
		VDrum01-EC-1-0102	Equipment Component

**Design Basis Objects** - Displays the name of design basis object for which there is no matching 3D object.

**3D Objects** - Displays the name of the 3D object. Click , and select the 3D object from the list to filter not correlated objects based on the 3D object.

- **[All]** - Displays all the objects. This option is selected by default.
- **[Custom Filter]** - Allows you to customize the object filtering. Displays **AutoCorrelate Custom Filter** when you select this option. To filter, type the exact object name or type \* and % special characters as the first or last characters in the **AutoCorrelate Custom Filter** box.

**3D Type** - Displays the object type. Click , and select the object type from the list to filter not correlated objects based on the object type.

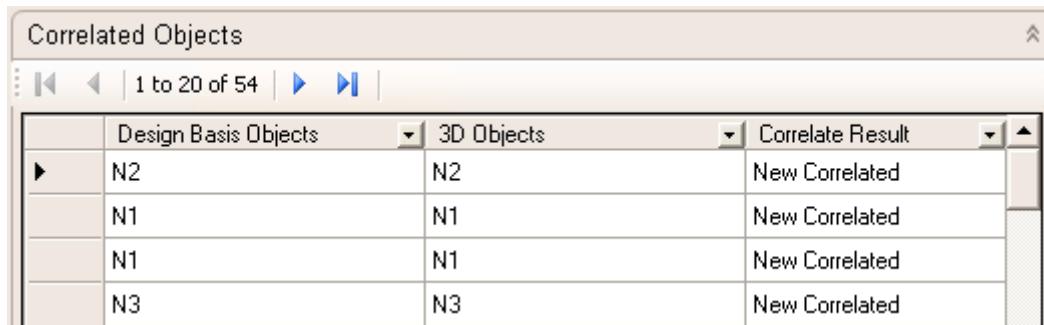
- **[All]** - Displays all the objects. This option is selected by default.
- **[Custom Filter]** - Allows you to customize the object filtering. Displays **AutoCorrelate Custom Filter** when you select this option. To filter, type the exact 3D type name or type \* and % special characters as the first or last characters in the **AutoCorrelate Custom Filter** box.

**NOTES** A 3D object is not correlated for the following possible reasons:

- 3D object has no design basis object.
- 3D object does not have a design basis object with matching properties and topology.
- 3D object's parent and the design basis object are not correlated.
- You do not have write permission to update the 3D object.

## Correlated Objects

Contains a list of 3D objects with matching design basis objects. This list contains both newly correlated objects and existing correlated objects.



The screenshot shows a dialog box titled "Correlated Objects". At the top, there is a navigation bar with icons for back, forward, and search, followed by the text "1 to 20 of 54". Below this is a table with three columns: "Design Basis Objects", "3D Objects", and "Correlate Result". The table contains four rows of data:

Design Basis Objects	3D Objects	Correlate Result
N2	N2	New Correlated
N1	N1	New Correlated
N1	N1	New Correlated
N3	N3	New Correlated

**Design Basis Objects** - Displays the name of the correlated design basis object. Click , and select the 3D object from the list to filter correlated objects based on the 3D object.

- **[All]** - Displays all the objects. This option is selected by default.
- **[Custom Filter]** - Allows you to customize the object filtering. Displays **AutoCorrelate Custom Filter**, when you select this option. To filter, type the exact object name or a special character as the last character in the **AutoCorrelate Custom Filter** box.

**3D Objects** - Displays the name of the correlated 3D object. Click , and select the 3D object from the list to filter not correlated objects based on the 3D object.

- **[All]** - Displays all the objects. This option is selected by default.
- **[Custom Filter]** - Allows you to customize the object filtering. Displays **AutoCorrelate Custom Filter**, when you select this option. To filter, type the exact object name or a special character as the last character in the **AutoCorrelate Custom Filter** box.

**Correlate Result** - Specifies whether the object is already correlated or newly correlated. Click , and select the result type from the list to filter the correlated object list based on the correlate result.

- **[All]** - Displays both newly correlated and existing correlated results. This option is selected by default.
- **New Correlated** - Displays only objects that are newly correlated results.
- **Existing Correlated** - Displays only objects that are manually correlated, and the objects that are correlated prior to auto correlation.
- **[Custom Filter]** - Allows you to customize the object filtering. Displays **AutoCorrelate Custom Filter**, when you select this option. To filter, type the exact text in the **AutoCorrelate Custom Filter** box.

**3D Type** - Displays the object type. Click ▾, and select the object type from the list to filter not correlated objects based on the object type.

- **[All]** - Displays all the objects. This option is selected by default.
- **[Custom Filter]** - Allows you to customize the object filtering. Displays **AutoCorrelate Custom Filter**, when you select this option. To filter, type the exact 3D type name or a special character as the last character in the **AutoCorrelate Custom Filter** box.

▲ - Expands or collapses the section.

**Correlate** - Correlates selected 3D object and matching design basis object.

**Save** - Saves the auto correlation report as an xml file.

**Cancel** - Closes the report.

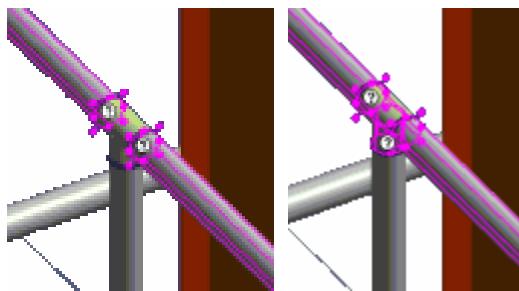
## Compare Design Basis Command

Compares the differences in property and topology (or shape) values in the three-dimensional model and the design basis (for example, a P&ID). The purpose of the command is to update the properties on correlated objects so that values for mapped properties (design basis) from tools, such as SmartPlant P&ID and SmartPlant Instrumentation, are updated on the object if you specify to update and pass the values. You can also process deleted objects. As a result, you are managing the changes of the model to match the design basis without having to re-model.

### Topology Checker

The topology checker simply starts at one end of the pipeline and moves to the end of the line. There are some rules that you should be aware of in order to make sure the topology checker is running properly.

- Tees and reducers have the unique ability to belong to three different runs. For the purpose of topology comparison, any piping component can be considered to be in two runs.
- A pipe run must be continuous for the topology to be checked properly. This means that no component (tees included) can belong to a different run along that line. For example, if the third component along a pipe run was a tee that belonged to the branch run, then the topology checker would not give proper results because the tee breaks the run. There are piping components that are still members of that first run, but the run is not continuous (left image: tee is not highlighted). After this tee is made a member of the original run, the topology checker gives proper results (right image: tee is highlighted).



For more information on the topology checker, see the *Piping User's Guide*.

**NOTE** Work Breakdown Structure (WBS) relationships (project or as-built) are shown on the **Property** tab of the **Compare with Design Basis** dialog box. However, the **Update** button does not update project membership for 3D objects to match the design basis. Use the **Claim** command to claim objects to the project.

#### See Also

*Retrieving Data* (on page 565)

## Compare with Design Basis Dialog Box

Compares and examines the mapped properties for both the design basis object on the P&ID and in the 3D model. This dialog box identifies the properties that are different due to a discrepancy. You can update all of the properties listed in the dialog box by clicking **Update**.

**NOTE** Work Breakdown Structure (WBS) relationships (project or as-built) are shown on the **Property** tab. However, the **Update** button does not update project membership for 3D objects to match the design basis. Use the **Project > Claim** command to claim objects to the project.

#### See Also

*Compare Design Basis Command* (on page 595)

*Correlate with Design Basis Command* (on page 583)

*Properties Tab (Compare with Design Basis Dialog Box)* (on page 596)

*Topology Tab (Compare with Design Basis Dialog Box)* (on page 597)

## Properties Tab (Compare with Design Basis Dialog Box)

**Selected** - Specifies the name of the selected object in the 3D model. The **Selected** drop-down lists all objects in the 3D model that are correlated with the design basis object.

**Category** - States the category for the property. Properties are listed in alphabetical order according to the interface of the category that you selected for the property pages of the 3D model. Select **All** to list all the properties in alphabetical order.

The read-only field beside the **Category** box provides the following information about the correlation for the object that you selected in the 3D model:

- **Property Match** - Indicates that the object that you selected in the model has all properties matching those of its correlated design basis object.
- **Property Mismatch** - Indicates that the object that you selected in the model has one or more properties with values not matching the value of the mapped property in the correlated object.

The check box beside the **Model Property Name** allows you to selectively update the properties in the list. You must select **Copy properties from design basis** to enable the selective update check boxes.

- indicates clear or disabled state. Selective update is disabled or none of the properties are selected for update.
- indicates select state. All the properties in the list are selected for update.
- indicates mixed state. One or more properties in the list are either read-only or not selected for update.
- indicates read-only. You cannot update this property.

## NOTES

- You must check the selective update check box of the corresponding property to set its correlation status to **Property Match**.
- The software remembers the last saved selective update preference for an object type such as a pipe run, equipment, and pipeline system. For example, if you do not want to update **Name** for piperun1, clear the checkbox corresponding to **Name**, and then click **Update**. When you correlate piperun2, the dialog box displays your preference from the piperun1 you last correlated.

**Model Property Name** - States the name of the property for the model object.

**Design Basis Value** - States the value of the property for the design basis object.

**Model Value** - States the value of the property for the three-dimensional model object.

**Correlation Approval Status** - Specifies if the object is approved with discrepancies in the 3D model data compared with design basis data. Select **Topology mismatch approved** if the object topology mismatch can be ignored. Select **Data and Topology mismatches approved** if the object data and topology mismatches can be ignored. Select **None** if you do not want to approve a mismatch.

**Copy properties from design basis** - Controls copying of properties from the design basis object to the 3D model object. Select this option to allow the update of 3D object properties during manual correlation. Clearing this option clears and disables all the selective update check boxes.

**Update** - Transfers data from the design basis object (in the P&ID, for example) to match the 3D model object. Clicking **Update** changes entire property values if selective update check box is disabled.

**Close** - Closes the **Compare with Design Basis** dialog box.

 **NOTE** Work Breakdown Structure (WBS) relationships (project or as-built) are shown on the **Property** tab. However, the **Update** button does not update project membership for 3D objects to match the design basis. Use the **Project > Claim** command to claim objects to the project.

## **See Also**

*Compare Design Basis with the Model* (on page 598)

*Compare with Design Basis Dialog Box* (on page 596)

## **Topology Tab (Compare with Design Basis Dialog Box)**

Displays the child objects of the selected grouping object and indicates both the 3D objects not correlated to the P&ID (design basis) and also the P&ID objects (design basis) not correlated to 3D objects. For example, when you select a pipe run, the **Topology** tab indicates objects that are correlated and in the same order on the pipe run, as well as objects that are correlated and not in the same order on the pipe run.

 **NOTE** This tab is available only for those objects that support correlation and get topology from the design basis.

### **Selected**

Displays the name of the selected object in the 3D model.

The read-only field provides the following information about the correlation for the object you selected in the 3D model:

- **Topology Match** - Indicates that the object in the model you selected has a match or correlation with an object in the design basis.
- **Topology Mismatch** - Indicates that the object in the model you selected does not have a match or correlation with an object in the design basis.

#

Indicates an index number to reference the object as defined in the design basis (that is, the drawing).

#### Design Basis Name

States the name of the object in the design basis (for example, a pipe run).

#### Model Name

States the name of the object in the 3D model.

#### Select

Selects a row in the grid. The object highlights in the model.

#### Close

Closes the **Compare with Design Basis** dialog box.

 **NOTE** If a discrepancy exists on the **Topology** tab after clicking **Update** on the **Properties** tab, you can trace the discrepancy and attempt to resolve it. For example, a discrepancy might be an object routed or placed out of order.

#### See Also

*Compare Design Basis with the Model* (on page 598)

*Compare with Design Basis Dialog Box* (on page 596)

## Compare Design Basis with the Model

The **Compare with Design Basis** command allows you to resolve discrepancies between an object in the 3D model and the design basis.

1. Click **SmartPlant > Retrieve** to retrieve data into the software.
2. Click **SmartPlant > View P&ID** to open the P&ID that contains the data that you retrieved.
3. Select an object on the P&ID or in the model.
4. Click **SmartPlant > Compare Design Basis**.
5. Review the **Properties** tab for highlighted objects that have a discrepancy between the P&ID and the three-dimensional model. Objects that do not match appear in a different background color (red).
6. Review the **Topology** tab to check for differences in shapes between the P&ID and the 3D model. This tab is available only for objects that support correlation.

 **TIP** When you select a pipe run, the **Topology** tab indicates objects that are correlated and in the same order on the pipe run, as well as objects that are correlated and not in the same order on the pipe run.

7. Click **Close** if you do not want to update the properties from design basis.

-OR-

After you correct the errors that cause the discrepancy, click **Update** on the **Compare with Design Basis** dialog box to transfer data from the design basis object to the 3D model object and update properties that are out-of-date. The **Design Basis Value** and the **Model Value** columns change to show the new values.

#### TIPS

- Clicking **Update** changes the property values. You can selectively update properties by selecting associated check boxes. For more information see, *Properties Tab (Compare with Design Basis Dialog Box)* (on page 596).
- For certain exceptions, the software does not process an update. For example, an object that is not mapped with properties is not updated.

When you have finished your review, click **Close**.

## Remove Correlation with Design Basis Command

The **SmartPlant > Remove Correlation with Design Basis** allows you to remove the correlation between 3D object and the design basis.

The **Remove correlation with Design Basis** command filters the correlated objects from the selected 3D objects and uncorrelates the correlated objects from the design basis.

### Remove Correlation with Design Basis Ribbon Bar

#### Inside Fence

Selects all objects entirely inside the fence.

#### Overlapping Fence

Selects all objects entirely inside the fence and those objects outside but touching the fence.

#### Select Correlated Objects

Selects correlated objects.

#### Finish

Completes the uncorrelation of 3D objects from design basis.

### See Also

*Remove correlation with design basis* (on page 599)

## Remove correlation with design basis

Removes correlation from a 3D model object to a design basis object.

1. Select **SmartPlant > Remove Correlation with Design Basis**.

*The software prompts you to select correlated objects.*

2. Select objects using **Inside Fence**  and **Overlapping Fence** .

3. Click **Finish**.

*The software filters the correlated objects from the selected 3D objects and un-correlates the correlated objects.*

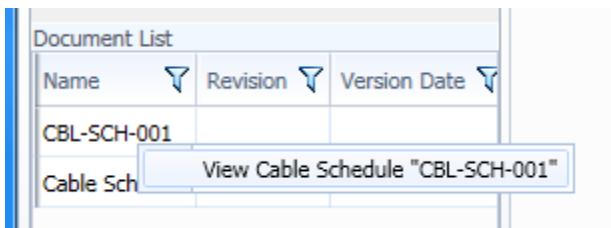
## Design Basis Viewer Command

The **SmartPlant > Design Basis Viewer** allows you to correlate and compare design basis data from any engineering document retrieved to the active model. Design basis viewer allows you to correlate a design basis object that is not represented on a P&ID. This option is available on the **SmartPlant** menu for Common, Piping, Equipment and Furnishings, and Electrical.

You can choose a document by using the document filter options. The **Document List** displays a list of filtered documents according to the document filters. The list is empty if no document matches the filter criterion. Double-click on a document to display a list of design basis data with their current correlation status in the adjacent panel. You can use the design basis objects to access items, such as equipment, piping information, and SmartPlant Instrumentation dimension data, to create appropriate 3D design objects.

Similar to P&ID viewer, you can resize the design basis viewer with the standard Windows commands on the title bar, such as **Minimize**, **Maximize**, and **Close**.

Right-click a row in the viewer to display a context menu of commands. These commands apply to the row that you right-clicked, regardless of any selected row. Right-clicking a row does not select that row. The document name displays in the context menu to make it clear which row you right-clicked. When appropriate, **Remove Correlation with Design Basis** also displays on the context menu. For more information, see *Remove Correlation with Design Basis Command* (on page 599).



### See Also

- [Retrieving Data \(on page 565\)](#)
- [Compare a design basis object with 3D object \(on page 602\)](#)
- [Correlate a design basis object with 3D object \(on page 603\)](#)

## Design Basis Viewer Dialog Box

### Object Selection

Contains document filter options and displays documents based on the filter criterion.

### Document Filter

Filters documents based on the value you type. Type a value to search among all the retrieved documents.

- **Document Type** - Filters matching documents of only the selected document type. Choose **Electrical documents**, **Dimensional Data Sheets (DDP)**, **P&ID**, or **PBS Document**.
- **Name** - Filters all possible matching documents with the specified name. Type a name to search among all the retrieved documents.

- **Revision** - Filters all possible matching documents with the specified revision number. Type a number to search among all the retrieved documents.
- **Version Date** - Filters all possible matching documents with the specified version date. Click on  to select the date or type the date in MM/DD/YYYY format.

### Document List

Displays the document list based on the Document Filters. You can use a single filter or a combination of filters for precise results. You can sort the list in ascending or descending order by clicking on the column headers.

- **Name** - Displays the name of the document.
- **Revision** - Displays the latest revision number of the document.
- **Version Date** - Displays the latest version date of the document.
- **PBS Parent** - Displays the name of parent model break down system.

### Design Basis Objects List

Displays all the design basis objects in the document that you select from the Document List. You can sort the list in ascending or descending order by clicking on the column headers.

#### Name

Displays the name of the design basis object.

#### Type

Displays the type of design basis object, such as DIMInstrument, PIDPipe, PIDNozzle, etc.

#### Document

Displays the retrieved document name the design basis object belongs to.

#### SP3D Name

Displays the three-dimensional object name of the corresponding design basis object.

#### SP3D Correlation Basis

Displays if the three-dimensional object is correlated to a corresponding design basis object.

#### SP3D Correlation Status

Displays the correlation status of the 3D object.

 **TIP** Use the **Filter**  to search design basis objects that are not correlated.

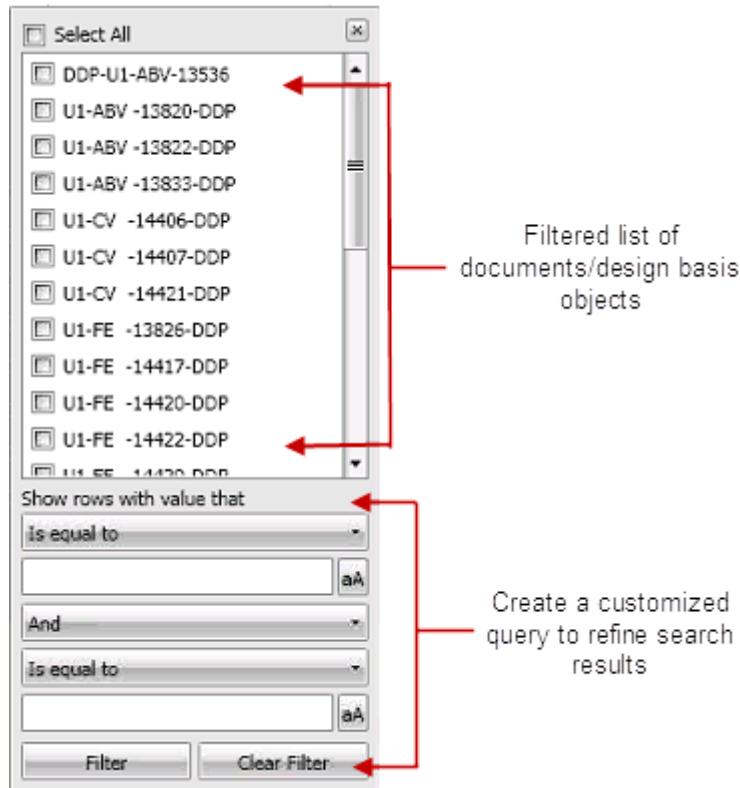
#### SP3D Correlation Approval Status

Displays if the component is approved with discrepancies in the 3D data compared with design basis data.

#### Filter

Displays a pop up menu with more filter options for further refined filtering. For example, above filter criterion may display a long list of possible matches. In such a scenario you may want to refine your search by narrowing down the filter criteria. This filter menu allows you to

customize your search query to improve the results.



### See Also

- [Correlate a design basis object with 3D object \(on page 603\)](#)
- [Compare a design basis object with 3D object \(on page 602\)](#)

## Compare a design basis object with 3D object

The **Compare with Design Basis** command allows you to resolve discrepancies between a 3D object and the design basis object.

1. Select **SmartPlant > Design Basis Viewer**

*The Design Basis Viewer dialog box is displayed.*

2. Select a document by using the **Document Filter** options.

*A list of matching documents is displayed in the Document List grid.*

3. Click on the required document.

*A list of all design basis objects is displayed.*

4. Right-click an object that you want to compare.

5. Select **Compare with Design Basis** command.

*The software displays the Compare with Design Basis Dialog Box (on page 596).*

6. Review the **Properties** tab for highlighted objects that have a discrepancy between the design basis object and the 3D object. Objects that do not match appear in a different background color (red).
7. Review the **Topology** tab to check for differences in shapes between the design basis object and the 3D object. This tab is available only for objects that support correlation.
8. Click **Close** if you do not want to update the properties from design basis.

-OR-

After you correct the errors that cause the discrepancy, click **Update** on the **Compare with Design Basis** dialog box to transfer data from the design basis object to the 3D object and update properties that are out-of-date. The **Design Basis Value** and the **Model Value** columns change to show the new values.

#### ! TIPS

- Clicking **Update** changes the property values. You can selectively update properties by selecting associated check boxes. For more information see, *Properties Tab (Compare with Design Basis Dialog Box)* (on page 596).
- For certain exceptions, the software does not process an update. For example, an object that is not mapped with properties is not updated.

9. After you finish reviewing, click **Close**.

## Correlate a design basis object with 3D object

1. Click **SmartPlant > Retrieve** to retrieve design basis data into the software, such as an **Electrical, Dimensional Data Sheets (DDP)**, **P&ID**, or a **PBS Document**.
2. Click **SmartPlant > Design Basis Viewer**.  
*The Design Basis Viewer dialog box is displayed.*
3. Select a document by using the **Document Filter** options.  
*A list of matching documents is displayed in the Document List grid.*
4. Click on the required document.  
*The software displays a list of all design basis objects.*
5. Right-click an object that you want to correlate.
6. Select **Correlate with Design Basis** command.  
*On the status bar, the software prompts you to select a 3D item in the model to correlate.*
7. Select a 3D item in the model.  
*The software then displays the Correlate with Design Basis Dialog Box (on page 584) dialog box.*
8. If the software detects that the design basis object is already correlated to one or more 3D objects, the following information message displays. Click **Yes** to continue.  
*Selected Design Basis object is already correlated to another 3D object. Are you sure you want to correlate more than one 3D object the same Design Basis object?*

9. Review the **Properties** tab for highlighted objects that have a discrepancy between the design basis object and the 3D object. Objects that do not match are displayed in a different background color (red).
10. Review the **Topology** tab to understand the differences in shapes between the 3D model and the design basis.
11. Select **Copy properties from design basis** option if you want to update the 3D object properties. Clear this option to prevent overwriting the 3D object properties from design basis.
12. Click **Update** to correlate the 3D object with design basis object.

## Review design basis object properties

1. Select **SmartPlant > Design Basis Viewer**  
*The Design Basis Viewer dialog box is displayed.*
2. Select a document by using the **Document Filter** options.  
*A list of matching documents is displayed in the **Document List** grid.*
3. Click on the required document.  
*A list of all design basis objects is displayed.*
4. Right-click an object that you want to review.
  - Select **Design Basis Properties** command to review non-correlated design basis object properties.
  - Select **Correlated Object Properties** command to review correlated design basis object properties.

**NOTE** This command displays properties for a cable run rather than the cable occurrence.
5. After you finish reviewing, click **Close**.

## SECTION 12

# Tasks Menu

The software uses tasks to separate its user interface into discipline-specific user environments. Tasks are sets of commands focused on a particular engineering discipline, such as routing pipe or placing equipment. You usually need only a few of these tasks to accomplish your particular job. For example, if you are a piping designer, you probably only need to use the tasks that allow you to route pipe or create isometric drawings.

You define the tasks that appear on the **Tasks** menu by using the **Configure Task List** command. This command allows you to specify the tasks and the sequence you want them to appear on the **Tasks** menu. The software saves the selected tasks in the active workspace. Each workspace can display a different list of tasks on the **Tasks** menu. You can configure the **Tasks** menu for the workspace at any time.

To switch to a different task, click the task you want on the **Tasks** menu. When you activate a new task, the views remain unchanged, but the menu commands and tool bars are replaced by the new task. The software does not create new views of the model when you switch to another task. The Catalog, Systems and Specifications, and Project Management tasks do not have views of the model. Also, some tasks do not appear in the list if you did not install them.

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## Catalog

Switches to the Catalog task.

The Catalog task allows you to view and edit the Catalog database. Under the root for the Catalog database, you can select from catalogs such as Piping, Equipment, and Duct. You can create and edit select lists, piping specifications, and part data in this task. There are also tools to help you validate catalog data.

## Common

Switches to the Common task.

The Common task refers to the functions shared with other tasks and identifies the commands required to accomplish these functions. Each task user must use these commands when they need to perform certain functions. This guideline ensures that everyone using the numerous tasks of the software performs common operations in the same way.

The task allows you to define a workspace and perform common operations on that workspace, also known as your session. The workspace represents the portion of the model data you need to perform your intended task. This workspace also includes the view settings for user modeling. Many other tasks on the **Tasks** menu are not available until you have defined and saved your workspace.

After defining your workspace, you can use the **Tasks** menu to move among the various design tasks. You can perform specified functions, depending on your access permissions. After you select a task, the interface and available functionality appear. Some of the commands and functionality are unique to the particular task. For example, some commands for the Piping task are not available in the Equipment and Furnishings task. However, most of the Common task commands are available in all of the various design tasks. You use the Common task commands and functionality the same way regardless of the active task. For example, the **View** and **File** menu commands function the same way in every task.

## Compartmentation

Switches to the Compartmentation task.

The Compartmentation task allows you to define the functional layout of a ship by creating compartments, ship zones, and other volume objects within the ship.

You can define the geometry of volume objects in a variety of ways: by two points, by four points, by other surfaces, or by other volumes. You can also create a volume object in the model by defining a path and projecting a cross section along the path. In addition to these functions, you can import a plate system from a SAT file to create compartments.

After creating volumes, you can specify loads that are applied to the volumes. Load folders, spatial loads, and unit loads appear on the **Analysis** tab in the **Workspace Explorer**.

## Drawings and Reports

Switches to the Drawings and Reports task.

The Drawings and Reports task creates two-dimensional drawings from the three-dimensional model. You can produce drawings to e-mail to another person, to print, or to publish.

This task provides a drawing update process to increase productivity for your company. After the 3D model changes, you can update drawings locally or on a batch server.

The task provides drawing types, such as Piping Plan and Equipment Plan that can be customized to your needs. Using the component functionality of the console, you can create, edit, update, and print drawings and reports.

The Drawings and Reports task also provides the ability to create and publish the 3D model data.

## Electrical

Switches to the Electrical task.

The Electrical task provides a workspace for distributed cableway system design and routing of conduit and cable. The task creates a three-dimensional representation or model of a distributed system. You can create a fully rendered 3D model of the various cableway systems in your model.

The Electrical task uses point-by-point route design and inserts cableway components and splits during design. Also, the task includes placement of conduit, the hollow tubing used to house and protect cables.

After you complete a cableway design and route conduit, you then route cables through existing conduit and cableways. The Electrical task provides commands that allow you to create cables and their properties, edit cable routes, which includes defining where cables enter and exit cableway, and display the existing route of a cable.

The Electrical task also provides a command for retrieving cable schedules in an integrated environment.

## Equipment and Furnishings

Switches to the Equipment and Furnishings task.

You can use this task to select equipment objects from the catalog and position occurrences of these objects in the model. After they are placed, you can define relationships among pieces of equipment, and rotate equipment within the model to obtain precisely the design your specifications require.

The software also provides the ability to design custom equipment models, using Visual Basic or Solid Edge software, and bulk load those objects into your Catalog database. By enabling users to expand the available selection of equipment objects, the software frees you to implement the equipment solution necessary for your design. The task also allows you to modify the properties of a piece of equipment on an occurrence-by- occurrence basis.

## Geometry Analysis and Repair

Switches to the Geometry Analysis and Repair task.

The Geometry Analysis and Repair task allows you to analyze, check, and repair hullform models before using them to create an imported plate system in the Molded Forms task. You can run the Geometry Analysis and Repair commands on hullforms that will be used in "early design" activities as well as hullforms that will be used to detail and manufacture the ship.

## Grids

Switches to the Grids task.

The Grids task creates and manipulates coordinate systems, elevation grid planes, vertical grid planes, and grid lines.

Coordinate systems provide a locating scheme when working in the model. The grid lines of a coordinate system represent the relative positioning requirements for a specific design purpose.

## Hangers and Supports

Switches to the Hangers and Supports task.

The primary purpose of hangers is to support various types of distributive systems such as pipes, HVAC, and cable ducts. Although these are the main elements on which hangers depend, hangers must be connected to structural parts such as beams and horizontal braces for their support.

## Hole Management

Switches to the Hole Management task.

The Hole Management task places holes in structures for parts such as pipes, ducts, cables, and equipment that penetrate the structure. The holes are associated with the structure and the penetrating part so that if either one is modified, the hole is automatically adjusted by the software.

## HVAC

Switches to the HVAC task.

The HVAC task provides a workspace for distributed duct system design. The task creates a three-dimensional representation or model of a distributed system. You can create a fully rendered 3D model of the various duct systems.

The HVAC task uses point-by-point route design and inserts HVAC components and splits during design. Complete specification control selects exactly the type of parts you need. You can also modify HVAC features as design needs arise.

## Molded Forms

Switches to the Molded Forms task.

The Molded Forms task is used to define the basic structure of the ship including: the hull, decks, bulkheads, major openings, stiffeners, beams, design seams, and so forth. Using this task, you specify the high-level design systems of the ship structure. These systems themselves have no thickness, but contain the attributes, such as thickness, continuity, and molded conventions, to use in the ship model as the model becomes more detailed. These attributes are used to detail the ship model in the Structural Detailing task and to generate data for manufacturing in the Structural Manufacturing task.

## Piping

Switches to the Piping task.

The Piping task is used to model distributed pipelines in your model using a point-by-point design method. Using the Piping task, you can create a fully rendered three-dimensional model of the various pipelines in your model. You can also use this task to insert piping components, instruments, and splits during design and then spool the pipe.

## Planning

Switches to the Planning task.

The Planning task lets you define the assembly hierarchy (production bill of material) of the ship by creating blocks, assemblies, and by specifying the assembly sequence.

## Space Management

Switches to the Space Management task.

This task creates and manages named spaces in your design. Using volumes, you can define safety zones, areas set aside for distinct processes, maintenance regions, or any other conceptual spaces that you need. A zone can refer to one or more space systems and areas, while an area can be entirely or partially part of several different zones.

Several methods are available for you to define the geometry of a volume. You can define spaces by two points, four points, or by reference to existing spaces. In addition to these functions, you can also merge existing spaces together.

The Space Management task also provides the commands necessary to create drawing volumes.

### See Also

*Tasks Menu* (on page 605)

## Structural Analysis

Switches to the Structural Analysis task.

The Structural Analysis task places and modifies pre-analysis objects such as load cases and load combinations, loads, and boundary conditions. Also in this task, you can use the model geometry created in Smart 3D to generate a CIMsteel Integration Standards Release 2 analytical model for structural analysis and design. Results from analysis and design can be imported back into the model for immediate update of the members.

## Structural Detailing

Switches to the Structural Detailing task.

The Structural Detailing task is used to create, detail, and maintain structure members.

## Structural Manufacturing

Switches to the Structural Manufacturing task.

The Structural Manufacturing task is used to create, detail, and maintain structure members.

## Structure

Switches to the Structure task.

The Structure task places and modifies structural objects. Using this task, you can place beams, columns, braces, truss elements, cables, equipment foundations, column footings, openings, slabs, and connections in your model. You can also create custom section shapes using 2D Symbols and place those custom sections in the model.

The Structure task also provides for traffic needs by placing stairs, ladders, and handrails.

**NOTE** Although not required, it is recommended that you place grids using the Grids task before placing structural members.

## Systems and Specifications

Switches to the Systems and Specifications task.

The Systems and Specifications task defines a system hierarchy for your design. All design data can then be organized under this hierarchy. In addition to organizing the various piping, equipment, duct, cableway, and structural elements into systems in the hierarchy, you can also assign the allowed specifications for each system. These specifications then limit part selection and placement based on the specific design needs of your project.

The available system types that can be created are Ducting, Piping, Pipeline, Electrical, Conduit, Structure, Equipment, Generic, Area and Unit. By organizing design information into systems, the software enables queries and filters by the systems you have defined. This filtering makes it much simpler to obtain information on only the portion of the total design that you need at any given time.

## Configure Task List

Specifies all of the tasks in the sequence you want them to appear on the **Tasks** menu. A task is a set of commands specific to a particular engineering discipline, such as routing pipe.

You can configure the **Tasks** menu for the workspace at any time. The software saves the selected tasks in the active workspace. Each workspace can have a different list of tasks on the **Tasks** menu. After you define the commands and their sequence on the **Tasks** menu, you can switch to a different task by clicking the task name on the **Tasks** menu.

## Configure Tasks

1. Click **Tasks > Configure Task List**.
2. Select the tasks you want to add to the menu from the **Available task environments** list.
3. Click **Add**.
4. If you want to remove tasks in the task list, click the task names under **Task list**, and then click **Remove**.

### NOTES

- After you configure the **Tasks** menu, you can switch to a different task by clicking the task name on the **Tasks** menu.
- Tasks appear on the **Tasks** menu in the sequence that they appear on the task list. You can use the **Move Up** and **Move Down** buttons on the **Configure Task List** dialog box to change the order of the tasks.
- Each time that you open a new workspace, you can configure a new **Tasks** menu.

## Configure Task List Dialog Box

Configures the **Tasks** menu for your workspace.

### Available task environments

Lists all of the tasks installed on your computer. A task is a set of commands specific to a particular engineering discipline, such as routing pipe. To select multiple tasks in this list, hold CTRL and then click each object you want to select. You also can select several tasks by selecting one task and holding SHIFT while selecting another task. All tasks between the two are selected as well.

### Task list

Lists all tasks in the sequence in which you want them to appear on the **Tasks** menu. To select multiple tasks in this list, hold down CTRL and then click each object that you want to select. You also can select several tasks by selecting one task and holding SHIFT while selecting another task. All tasks between the two are selected as well.

### Add

Copies the selected tasks to the **Task list** box. Tasks in the **Task list** box appear on the **Tasks** menu. You must select one or more tasks in the **Available task environments** list before clicking this button.

### Remove

Deletes the selected tasks from the **Task list** box. Tasks in the **Task list** appear on the **Tasks** menu. You must select one or more tasks in the **Task list** box before clicking this button.

### Move Up

Moves the selected tasks up in the **Task list** box and changes the order of the commands on the **Tasks** menu. You can move multiple tasks simultaneously by selecting more than one task in the **Task list**.

### Move Down

Moves the selected tasks down in the **Task list** box and changes the order of the commands on the **Tasks** menu.

## SECTION 13

# Windows Menu

Sometimes you need to see several parts of a workspace at once. You can have several windows open at one time. Each window can display a different view of the data in the workspace.

The **Window** menu contains commands that let you manage open windows. You can create new windows, or tile or cascade the open windows.

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## New Window

Opens a new graphical window. Opening multiple windows is useful for tasks like routing pipe, when you often need to view an object from several angles or to zoom in on different parts of a model at the same time. The new window appears on top of all the other windows and becomes the active window.

You can cascade the windows to see only the active window and the title bars of all the other windows, or tile horizontally or tile vertically to see all the windows at the same time. If you change the contents in one window, the other windows that contain the same information reflect the changes automatically without refreshing the view.

## Create a new window

Click **Window > New Window**.

### **NOTE**

- The software saves the number, size, and arrangement of all open windows in your workspace when you save the session.

## Cascade

Cascades all open windows diagonally across the screen so you can see the title bar of each window. The active window always appears in the bottom right front with the rest of the windows behind it. The windows appear at close to full window size and stack down and to the right from the active window. The rest of the windows appear in the order they appear in the **Window** menu. You can view the title bars of several windows in this way. When you have more windows open than will fit in the view, then a second group of windows stacks on top of the first group.

### Cascade windows

Click **Window > Cascade**.

 **NOTE** The software displays all the open windows overlapping so you can read the title bars, keeping the active window in the front.

## Tile Horizontally

Arranges multiple windows to fit horizontally on the screen without overlapping. The windows appear in roughly equal rectangular sizes to fill the application window. The active window appears on the top or the upper left. The software saves the number, size, and arrangement of all open windows in your workspace.

### Tile windows horizontally

Click **Window > Tile Horizontally**.

## Tile Vertically

Arranges multiple tall, thin windows to fit side-by-side on the screen without overlapping. The windows appear in roughly equal sizes to fill the application window. The active window appears in the upper left corner of the screen.

### Tile windows vertically

Click **Window > Tile Vertically**.

## SECTION 14

# Help Menu

The **Help** menu contains commands that provide information about the task. For example, you can open the online Help from the **Help** menu. The Help contains procedures, reference information, and conceptual overviews that can be accessed through a table of contents, keyword index, or full text search engine.

You can also get context-sensitive information about commands and dialog boxes in the software by pressing **F1**.

If you want information on a specific topic, you can use the **Index** and **Search** tabs in the online Help and type key words to narrow the search.

For documentation that you can print, use the **Printable Guides** command to display a list of all the delivered guides. You must have Adobe® Reader® installed to open and print the guides.

If you have added Help topics, which are customized to the day-to-day procedures and practices in your operation, the **Custom Documentation** command allows you to access this material in the software. The command opens a Web page that lists the customized files, which can be in formats like HTML Help (.chm), Microsoft Word documents (.doc), and Microsoft Excel workbooks (.xls). Other possible file types include HTML (.htm), SmartSketch (.igr), and text (.txt). A Web page is available for each task.

Lastly, you can find out the software version number and copyrights on the **About** dialog box. This dialog box also contains a **Tech Support** button to aid in getting customer assistance for troubleshooting problems.

### In This Section

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## Help

 Opens the online Help. The Help contains procedures, reference information, and conceptual overviews that can be accessed through a table of contents, keyword index, or full text search engine.

### See Also

*Help Menu* (on page 615)

## Display help topics

Click **Help > Smart 3D Help**.

### ■ NOTES

- You can view conceptual overviews and work through procedures while using the software.
- You can look up keywords on the **Index** tab and search for keywords or phrases on the **Search** tab.
- To bookmark a topic, you can add it to the list on the **Favorites** tab.
- Press F1 to display help on a dialog box or command.

### See Also

*Display Help Topics (on page 616)*

*Help Menu (on page 615)*

## Printable Guides

Opens a page in your default browser that includes links to the user's guides in portable document format. Click a link and the corresponding guide opens in Adobe Reader, which allows you to print the guide. The guides contain the same information that is in the online Help.

### See Also

*Access the Printable Guides (on page 616)*

*Help Menu (on page 615)*

## Access the Printable Guides

1. Click **Help > Printable Guides**.
2. In the browser that opens, click a link to a guide you want to view or print.

**◆ TIP** To print a guide, use the **File > Print** command in Adobe Reader. The shortcut keys for the **Print** command are CTRL+P.

### ■ NOTES

- The printable guides include administrative guides, user's guides, reference data guides, and third-party software guides.
- You must have Adobe Reader installed to open and print the guides.

If pages in the PDF file display very slowly, configure Adobe Acrobat or Adobe Reader to be a helper application. To do this, start Adobe Acrobat or Adobe Reader, click **Edit > Preferences**, select the **Internet** category, and clear the **Display PDF in browser** option.

### See Also

*Help Menu (on page 615)*

## Custom Documentation

Provides access to customized Help files and other material that documents the daily operations, specific to your operation. The command opens a Web page for the active task in the software and lists available files. The custom documentation can consist of HTML Help files (.chm), Microsoft Word documents (.doc), Microsoft Excel workbooks (.xls), HTML files (.htm), SmartSketch files (.igr), text files (.txt), or any other file type for which you have defined a default application.

You define the path to the custom documentation using the **File Locations** tab of the **Tools > Options** dialog box. For more information, see *Change a Default File Location* (on page 505).

## Access Customized Files

1. Click **Help > Custom Documentation**.

**! TIP** When you select **Custom Documentation**, a Web page opens and is associated with the active task. For example, if you are working in the Piping task and click **Custom Documentation**, the **Piping Custom Documentation** page opens.

2. Click the link for the customized file you want to open. The file opens in its associated application, such as Help, Excel, Word, or any other application for which you have defined a default type.

### NOTES

- The **Custom Documentation** command provides a method to integrate custom Help files that relate to the daily practices in your operation.
- You define the path to the custom documentation using the **File Locations** tab of the **Tools > Options** dialog box. For more information, see *Change a Default File Location* (on page 505).

### See Also

*Help Menu* (on page 615)

## APPENDIX A

# Appendix: Shortcuts

## ***In This Appendix***

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## Shortcut Keys

The following table lists the shortcut key combinations for various commands in the software.

Command or action	Shortcut keys
Change active axis of rotation (equipment objects)	Up Arrow key
<b>NOTE</b> The default axis of rotation is the Z-axis.	
Component or folder name change	F2
Copy	CTRL+C
Define workspace	CTRL+W
Delete objects	DELETE
Edit locate filter	CTRL+E
End a process	ESC
Fit all views	Hold SHIFT+A, and click <b>Fit</b> .
Help	F1
Hyperlink	CTRL+K
New workspace	CTRL+N
Open workspace	CTRL+O
Pan	CTRL+SHIFT+P
Pan (using mouse wheel)	Drag the middle mouse wheel to pan the view

<b>Command or action</b>	<b>Shortcut keys</b>
Pan up	CTRL+scroll mouse wheel down
Pan down	CTRL+scroll mouse wheel up
Pan left	CTRL+SHIFT+scroll mouse wheel down
Pan right	CTRL+SHIFT+scroll mouse wheel up
Paste	CTRL+V
PinPoint display on or off	F9
PinPoint target move	F12
PinPoint - unlock rectangular or spherical coordinates	F6 (E or absolute distance), F7 (N or horizontal angle), F8 (EL or vertical angle)
Previous View	ALT+F5
Print	CTRL+P
Recompute Objects (Compartmentation, Molded Forms, Structural Detailing, and Structural Manufacturing)	CTRL+R
Refresh Workspace	F5
Rotate about the current active axis (equipment objects)	Left and Right Arrow keys
Route in fast mode	SHIFT+F
Route plane lock by turn or branch	CTRL+4
Route plane lock by three points	CTRL+5
Route plane lock to EL east-west	CTRL+2
Route plane lock to EL north-south	CTRL+3
Route plane lock to no plane	CTRL+6
Route plane lock to Plan	CTRL+1
Save	CTRL+S
Select All	CTRL+A

Command or action	Shortcut keys
Selected objects do not move with the pointer during the <b>Move</b> command	F10
Shortcut menu for interface component (to open session file in Windows Explorer, dialog box, <b>Workspace Explorer</b> , etc.)	Right-click
SmartSketch locate surface	F3
SmartSketch lock constraint	CTRL+L or click middle mouse button or wheel
Add selected object to SmartSketch Locate List	CTRL+D
Start a command or confirm (OK) a dialog box	ENTER
<b>To Do List</b>	CTRL+T
Undo	CTRL+Z
Zoom	CTRL+SHIFT+Z
Zoom in	scroll mouse wheel up
Zoom out	scroll mouse wheel down

### See Also

*PinPoint* (on page 387)

## Shortcut Menus

Shortcut menus are menus that appear when you right-click certain areas or objects in the user interface. You can access shortcut menus by right-clicking an object in a graphical view or in the **Workspace Explorer**. The following commands appear on the shortcut menus.

### New System

Creates a new system without switching to the Systems and Specifications task. This command only appears in the **Workspace Explorer**.

### Select Nested

Selects the object and all nested children of the object.

### Get Features

Contains a group of commands that allow you to select a part of targeted route network. You can select one or more features on the network. The **Get Features** commands apply to features that are in the select set and are defined in the Workspace. You can use

combination of these commands to extend the targeted network as necessary. These commands are available only in Piping, Electrical, and HVAC tasks. For more information, see *Route Selection Commands* in Piping, Electrical or HVAC User's Guide.

## ★IMPORTANT

- You must select appropriate features option in the **Locate Filter**.
- **Get Features** commands do not support combination of features that belong to different tasks such as Piping and HVAC, or Electrical and HVAC.
- Duct banks and cable tray barriers are not supported. However, you can select a barrier in cable tray or a conduit in duct bank, and then run necessary commands.

**On Same Run** - Selects all features that belong to a same run even if the run is discontinued.

**On Same Leg** - Selects all features that belong to a same leg. The software also includes the along leg feature if the selected leg is a branch.

**On All Connected Branches** - Selects all features associated to the connected branches. You must select an along-leg feature that has a branch connected to it.

### For Connected Fittings

Adds the immediate connected fittings to the selection. You must select a branch component. For more information, see *Route Selection Commands* in Piping, Electrical or HVAC User's Guides.

### Get Connected Supports

Selects all supports connected to the selected feature. This command is available only in Piping, Electrical, and HVAC tasks. For more information, see *Route Selection Commands* in Piping, Electrical or HVAC User's Guide.

### Get Runs

Selects only the runs associated with the selected feature. This command is available only in Piping, Electrical, and HVAC tasks. For more information, see *Route Selection Commands* in Piping, Electrical or HVAC User's Guide.

### Get Continuously Connected

Selects the feature and all features that are continuously connected to that feature. For more information, see *Route Selection Commands* in Piping, Electrical or HVAC User's Guide.

### Copy

Copies the selected object and associated relationships to the Clipboard.

### Paste

Inserts the Clipboard contents in the model. This command is enabled after you copy an object.

### Create WBS Project

Initializes a new Work Breakdown Structure (WBS) project. This command only appears in the **Workspace Explorer**.

### Create WBS Item

Initializes a new Work Breakdown Structure (WBS) item. This command only appears in the

**Workspace Explorer.**

**Select WBS Assignment Method**

Specifies the Work Breakdown Structure (WBS) assignment method. This command only appears in the **Workspace Explorer**.

**Delete**

Removes the selected object from the database and deletes any relationships and notes on the object.

**Show**

Turns on the display of a selected object.

**Hide**

Turns off the display of a selected object.

**Claim**

Identifies objects in the model for modification in a project.

**Go to Hyperlink**

Views a file or a Web page associated with an object in the model. This command is available after you insert a hyperlink on an object.

**Properties**

Edits the properties of a selected object.

**See Also**

*Shortcut Keys (on page 618)*

## APPENDIX B

# Appendix: Units of Measure

The software provides a standard set of unit types and units for reference data. The unit information is stored in the Core component.

You can specify unit types and units for each user-defined attribute on the **Custom Interfaces** sheet in the reference data workbooks. Unit types are categories of measurement, and units are the specific quantities of measurement. For example, distance is a unit type, and meters (m) is a unit for the distance unit type.

Unit information can be grouped into the following categories:

- Unit Type Definitions to Names
- Unit Type Names to Definitions
- Unit Abbreviations to Names
- Unit Names to Abbreviations

### Unit Type Definitions to Names

Unit Type Definition	Unit Type Name
distance	UNIT_DISTANCE
angle	UNIT_ANGLE
mass	UNIT_MASS
time	UNIT_TIME
temperature	UNIT_TEMPERATURE
electric current	UNIT_ELECTRIC_CURRENT
luminous intensity	UNIT_LUMINOUS_INTENSITY
amount of substance	UNIT_AMOUNT_OF_SUBSTANCE
solid angle	UNIT_SOLID_ANGLE
angular acceleration	UNIT_ANGULAR_ACCELERATION
angular momentum	UNIT_ANGULAR_MOMENTUM
angular velocity	UNIT_ANGULAR_VELOCITY
area	UNIT_AREA

<b>Unit Type Definition</b>	<b>Unit Type Name</b>
body force	UNIT_BODY_FORCE
coefficient of thermal expansion	UNIT_COEFFICIENT_OF_THERMAL_EXPANSION
density	UNIT_DENSITY
electrical capacitance	UNIT_ELECTRICAL_CAPACITANCE
electrical conductance	UNIT_ELECTRICAL_CONDUCTANCE
electrical field strength	UNIT_ELECTRICAL_FIELD_STRENGTH
electrical inductance	UNIT_ELECTRICAL_INDUCTANCE
electrical potential difference	UNIT_ELECTRICAL_POTENTIAL
electrical resistance	UNIT_ELECTRICAL_RESISTANCE
energy	UNIT_ENERGY
entropy	UNIT_ENTHROPY
film coefficient	UNIT_FILM_COEFFICIENT
force	UNIT_FORCE
force per area	UNIT_FORCE_PER_AREA
force per distance	UNIT_FORCE_PER_DISTANCE
frequency	UNIT_FREQUENCY
heat capacity	UNIT_HEAT_CAPACITY
heat flux per area	UNIT_HEAT_FLUX_PER_AREA
heat flux per distance	UNIT_HEAT_FLUX_PER_DISTANCE
heat source	UNIT_HEAT_SOURCE
illuminance	UNIT_ILLUMINANCE
linear acceleration	UNIT_LINEAR_ACCELERATION
linear per angular	UNIT_LINEAR_PER_ANGULAR
linear velocity	UNIT_LINEAR_VELOCITY

<b>Unit Type Definition</b>	<b>Unit Type Name</b>
luminous flux	UNIT_LUMINOUS_FLUX
magnetic field strength	UNIT_MAGNETIC_FIELD_STRENGTH
magnetic flux	UNIT_MAGNETIC_FLUX
magnetic flux density	UNIT_MAGNETIC_FLUX_DENSITY
mass flow rate	UNIT_MASS_FLOW_RATE
mass moment of inertia	UNIT_MASS_MOMENT_OF_INERTIA
mass per area	UNIT_MASS_PER_AREA
mass per length	UNIT_MASS_PER_LENGTH
momentum	UNIT_MOMENTUM
per distance	UNIT_PER_DISTANCE
power	UNIT_POWER
electric charge	UNIT_ELECTRIC_CHARGE
radiant intensity	UNIT_RADIANT_INTENSITY
rotational stiffness	UNIT_ROTATIONAL_STIFFNESS
second moment of area	UNIT_SECOND_MOMENT_OF_AREA
thermal conductivity	UNIT_THERMAL_CONDUCTIVITY
dynamic viscosity	UNIT_DYNAMIC_VISCOSITY
kinematic viscosity	UNIT_KINEMATIC_VISCOSITY
volume	UNIT_VOLUME
volume flow rate	UNIT_VOLUME_FLOW_RATE
scalar	UNIT_SCALAR
force per area per length	UNIT_FORCE_PER_AREA_PER_LENGTH
moment	UNIT_MOMENT
first moment of area	UNIT_FIRST_MOMENT_OF_AREA
torsional warping constant	UNIT_TORSIONAL_WARPING_CONSTANT

<b>Unit Type Definition</b>	<b>Unit Type Name</b>
slope	UNIT_SLOPE
enumerator	UNIT_ENUM
NPD	UNIT_NPD
moment per distance	UNIT_MOMENT_PER_DISTANCE
wire gauge	UNIT_WIRE_GAUGE

**Unit Type Names to Definitions**

<b>Unit Type Name</b>	<b>Unit Type Definition</b>
UNIT_DISTANCE	distance
UNIT_ANGLE	angle
UNIT_MASS	mass
UNIT_TIME	time
UNIT_TEMPERATURE	temperature
UNIT_ELECTRIC_CURRENT	electric current
UNIT_LUMINOUS_INTENSITY	luminous intensity
UNIT_AMOUNT_OF_SUBSTANCE	amount of substance
UNIT_SOLID_ANGLE	solid angle
UNIT_ANGULAR_ACCELERATION	angular acceleration
UNIT_ANGULAR_MOMENTUM	angular momentum
UNIT_ANGULAR_VELOCITY	angular velocity
UNIT_AREA	area
UNIT_BODY_FORCE	body force
UNIT_COEFFICIENT_OF_THERMAL_EXPANSION	coefficient of thermal expansion
UNIT_DENSITY	density
UNIT_ELECTRICAL_CAPACITANCE	electrical capacitance

<b>Unit Type Name</b>	<b>Unit Type Definition</b>
UNIT_ELECTRICAL_CONDUCTANCE	electrical conductance
UNIT_ELECTRICAL_FIELD_STRENGTH	electrical field strength
UNIT_ELECTRICAL_INDUCTANCE	electrical inductance
UNIT_ELECTRICAL_POTENTIAL	electrical potential difference
UNIT_ELECTRICAL_RESISTANCE	electrical resistance
UNIT_ENERGY	energy
UNIT_ENTHROPY	entropy
UNIT_FILM_COEFFICIENT	film coefficient
UNIT_FORCE	force
UNIT_FORCE_PER_AREA	force per area
UNIT_FORCE_PER_DISTANCE	force per distance
UNIT_FREQUENCY	frequency
UNIT_HEAT_CAPACITY	heat capacity
UNIT_HEAT_FLUX_PER_AREA	heat flux per area
UNIT_HEAT_FLUX_PER_DISTANCE	heat flux per distance
UNIT_HEAT_SOURCE	heat source
UNIT_ILLUMINANCE	illuminance
UNIT_LINEAR_ACCELERATION	linear acceleration
UNIT_LINEAR_PER_ANGULAR	linear per angular
UNIT_LINEAR_VELOCITY	linear velocity
UNIT_LUMINOUS_FLUX	luminous flux
UNIT_MAGNETIC_FIELD_STRENGTH	magnetic field strength
UNIT_MAGNETIC_FLUX	magnetic flux
UNIT_MAGNETIC_FLUX_DENSITY	magnetic flux density
UNIT_MASS_FLOW_RATE	mass flow rate

<b>Unit Type Name</b>	<b>Unit Type Definition</b>
UNIT_MASS_MOMENT_OF_INERTIA	mass moment of inertia
UNIT_MASS_PER_AREA	mass per area
UNIT_MASS_PER_LENGTH	mass per length
UNIT_MOMENTUM	momentum
UNIT_PER_DISTANCE	per distance
UNIT_POWER	power
UNIT_ELECTRIC_CHARGE	electric charge
UNIT_RADIENT_INTENSITY	radiant intensity
UNIT_ROTATIONAL_STIFFNESS	rotational stiffness
UNIT_SECOND_MOMENT_OF_AREA	second moment of area
UNIT_THERMAL_CONDUCTIVITY	thermal conductivity
UNIT_DYNAMIC_VISCOSITY	dynamic viscosity
UNIT_KINEMATIC_VISCOSITY	kinematic viscosity
UNIT_VOLUME	volume
UNIT_VOLUME_FLOW_RATE	volume flow rate
UNIT_SCALAR	scalar
UNIT_FORCE_PER_AREA_PER_LENGTH	force per area per length
UNIT_MOMENT	moment
UNIT_FIRST_MOMENT_OF_AREA	first moment of area
UNIT_TORSIONAL_WARPING_CONSTANT	torsional warping constant
UNIT_SLOPE	slope
UNIT_ENUM	enumerator
UNIT_NPD	NPD
UNIT_MOMENT_PER_DISTANCE	moment per distance
UNIT_WIRE_GAUGE	wire gauge

**Unit Abbreviations to Names**

<b>Unit Abbreviation</b>	<b>Name</b>
m	DISTANCE_METER
nm	DISTANCE_NANOMETER
mm	DISTANCE_MILLIMETER
cm	DISTANCE_CENTIMETER
km	DISTANCE_KILOMETER
in	DISTANCE_INCH
ft	DISTANCE_FOOT
yd	DISTANCE_YARD
mi	DISTANCE_MILE
tenth	DISTANCE_TENTH
hundredth	DISTANCE_HUNDREDTH
thousandth	DISTANCE_THOUSANDTH
rod	DISTANCE_ROD
pole	DISTANCE_POLE
link	DISTANCE_LINK
chain	DISTANCE_CHAIN
pt	DISTANCE_POINT
furlong	DISTANCE_FURLONG
rad	ANGLE_RADIAN
deg	ANGLE_DEGREE
min	ANGLE_MINUTE
sec	ANGLE_SECOND
gr	ANGLE_GRADIAN
rev	ANGLE_REVOLUTION

---

<b>Unit Abbreviation</b>	<b>Name</b>
kg	MASS_KILOGRAM
g	MASS_GRAM
mg	MASS_MILLIGRAM
Mg	MASS_MEGAGRAM
grain	MASS_GRAIN
slug	MASS_SLUG
lbm	MASS_POUND_MASS
sinch	MASS_SLINCH
oz	MASS_OUNCE
tonne	MASS_METRIC_TON
ton	MASS_LONG_TON
net-ton	MASS_SHORT_TON
sec	TIME_SECOND
min	TIME_MINUTE
hr	TIME_HOUR
day	TIME_DAY
wk	TIME_WEEK
yr	TIME_YEAR
ms	TIME_MILLISECOND
ns	TIME_NANOSECOND
K	TEMPERATURE_KELVIN
F	TEMPERATURE_FAHRENHEIT
C	TEMPERATURE_CELCIUS
R	TEMPERATURE_RANKINE
A	ELECTRIC_CURRENT_AMPERE

<b>Unit Abbreviation</b>	<b>Name</b>
cd	LUMINOUS_INTENSITY_CANDELA
mol	AMOUNT_OF_SUBSTANCE_MOLE
sr	SOLID_ANGLE_STERADIAN
rad/s <sup>2</sup>	ANGULAR_ACCELERATION_RADIANS_PER_SQ_SECOND
deg/s <sup>2</sup>	ANGULAR_ACCELERATION_DEGREE_PER_SQ_SECOND
Hz/s	ANGULAR_ACCELERATION_CYCLE_PER_SQ_SECOND
kg·m <sup>2</sup> /s	ANGULAR_MOMENTUM_KILOGRAM_SQ_METER_PER_SECOND
rad/s	ANGULAR_VELOCITY_RADIANS_PER_SECOND
rad/min	ANGULAR_VELOCITY_RADIANS_PER_MINUTE
rad/hr	ANGULAR_VELOCITY_RADIANS_PER_HOUR
Hz	ANGULAR_VELOCITY_CYCLE_PER_SECOND
rpm	ANGULAR_VELOCITY_CYCLE_PER_MINUTE
rph	ANGULAR_VELOCITY_CYCLE_PER_HOUR
deg/s	ANGULAR_VELOCITY_DEGREES_PER_SECOND
deg/m	ANGULAR_VELOCITY_DEGREES_PER_MINUTE
deg/hr	ANGULAR_VELOCITY_DEGREES_PER_HOUR
m <sup>2</sup>	AREA_SQUARE_METER
mm <sup>2</sup>	AREA_SQUARE_MILLIMETER
cm <sup>2</sup>	AREA_SQUARE_CENTIMETER
km <sup>2</sup>	AREA_SQUARE_KILOMETER
in <sup>2</sup>	AREA_SQUARE_INCH
ft <sup>2</sup>	AREA_SQUARE FOOT
yd <sup>2</sup>	AREA_SQUARE_YARD
mi <sup>2</sup>	AREA_SQUARE_MILE

<b>Unit Abbreviation</b>	<b>Name</b>
ac	AREA_SQUARE_ACRE
ac	AREA_ACRE
N/m <sup>3</sup>	BODY_FORCE_NEWTON_PER CU_METER
N/cm <sup>3</sup>	BODY_FORCE_NEWTON_PER CU_CENTIMETER
N/mm <sup>3</sup>	BODY_FORCE_NEWTON_PER CU_MILLIMETER
kN/m <sup>3</sup>	BODY_FORCE_KILONEUTON_PER CU_METER
lbf/in <sup>3</sup>	BODY_FORCE_POUND_FORCE_PER CU_INCH
lbf/ft <sup>3</sup>	BODY_FORCE_POUND_FORCE_PER CU FOOT
/K	COEFFICIENT_OF_THERMAL_EXPANSION_PER_KELVIN
/C	COEFFICIENT_OF_THERMAL_EXPANSION_PER_CELCIUS
/F	COEFFICIENT_OF_THERMAL_EXPANSION_PER_FAHRENHEIT
/R	COEFFICIENT_OF_THERMAL_EXPANSION_PER_RANKINE
kg/m <sup>3</sup>	DENSITY_KILOGRAM_PER CU_METER
kg/mm <sup>3</sup>	DENSITY_KILOGRAM_PER CU_MILLIMETER
kg/cm <sup>3</sup>	DENSITY_KILOGRAM_PER CU_CENTIMETER
lbm/ft <sup>3</sup>	DENSITY_POUND_MASS_PER CU FOOT
lbm/in <sup>3</sup>	DENSITY_POUND_MASS_PER CU_INCH
slug/ft <sup>3</sup>	DENSITY_SLUG_PER CU FOOT
slinch/in <sup>3</sup>	DENSITY_SLINCH_PER CU_INCH
F	ELECTRICAL_CAPACITANCE_FARAD
S	ELECTRICAL_CONDUCTANCE_SIEMENS
V/m	ELECTRICAL_FIELD_STRENGTH_VOLT_PER_METER
V	ELECTRICAL_POTENTIAL_VOLT
ohm	ELECTRICAL_RESISTANCE_OHM

<b>Unit Abbreviation</b>	<b>Name</b>
J	ENERGY_JOULE
mJ	ENERGY_MICRO_JOULE
kJ	ENERGY_KILOJOULE
W-s	ENERGY_WATT_SECOND
W-hr	ENERGY_WATT_HOUR
kW-hr	ENERGY_KILOWATT_HOUR
in-lbf	ENERGY_INCH_POUND_FORCE
ft-lbf	ENERGY FOOT_POUND_FORCE
BTU	ENERGY_BTU
erg	ENERGY_ERG
eV	ENERGY_ELECTRON_VOLT
J/K	ENTHROPY_JOULE_PER_KELVIN
W/m <sup>2</sup> -K	FILM_COEFFICIENT_WATT_PER_SQ_METER_KELVIN
BTU/hr- ft <sup>2</sup> F	FILM_COEFFICIENT_BTU_PER_HOUR_SQ_FOOT_FAHRENHEIT
ft- lbf/ft <sup>2</sup> F	FILM_COEFFICIENT_FOOT_POUND_PER_SQ_FOOT_FAHRENHEIT
in- lbf/in <sup>2</sup> F	FILM_COEFFICIENT_INCH_POUND_PER_SQ_INCH_FAHRENHEIT
N	FORCE_NEWTON
nN	FORCE_NANONEWTON
mN	FORCE_MILLINEWTON
kN	FORCE_KILONEWTON
lbf	FORCE_POUND_FORCE
dyne	FORCE_DYNE
kip	FORCE_KIP

<b>Unit Abbreviation</b>	<b>Name</b>
Pa	FORCE_PER_AREA_PASCAL
mPa	FORCE_PER_AREA_MILLIPASCAL
kPa	FORCE_PER_AREA_KIOPASCAL
MPa	FORCE_PER_AREA_MEGAPASCAL
psi	FORCE_PER_AREA_POUND_FORCE_PER_SQ_INCH
ksi	FORCE_PER_AREA_KIP_PER_SQ_INCH
psf	FORCE_PER_AREA_POUND_FORCE_PER_SQ_FOOT
ksf	FORCE_PER_AREA_KIP_PER_SQ_FOOT
bar	FORCE_PER_AREA_BAR
mbar	FORCE_PER_AREA_MILLIBAR
atm	FORCE_PER_AREA_ATMOSPHERE
N/m	FORCE_PER_DISTANCE_NEWTON_PER_METER
N/mm	FORCE_PER_DISTANCE_NEWTON_PER_MILLIMETER
N/cm	FORCE_PER_DISTANCE_NEWTON_PER_CENTIMETER
kN/m	FORCE_PER_DISTANCE_KILONEWTON_PER_METER
lbf/in	FORCE_PER_DISTANCE_POUND_FORCE_PER_INCH
lbf/ft	FORCE_PER_DISTANCE_POUND_FORCE_PER_FOOT
kpi	FORCE_PER_DISTANCE_KIP_PER_INCH
kpf	FORCE_PER_DISTANCE_KIP_PER_FOOT
dyne/m	FORCE_PER_DISTANCE_DYNE_PER_METER
dyne/mm	FORCE_PER_DISTANCE_DYNE_PER_MILLIMETER
/sec	FREQUENCY_PER_SECOND
/min	FREQUENCY_PER_MINUTE
/hr	FREQUENCY_PER_HOUR
J/kg-K	HEAT_CAPACITY_JOULE_PER_KILOGRAM_KELVIN

<b>Unit Abbreviation</b>	<b>Name</b>
BTU/lbm-F	HEAT_CAPACITY_BTU_PER_POUND_MASS_FAHRENHEIT
W/m <sup>2</sup>	HEAT_FLUX_PER_AREA_WATT_PER_SQ_METER
kW/m <sup>2</sup>	HEAT_FLUX_PER_AREA_KILOWATT_PER_SQ_METER
in-lbf/s- in <sup>2</sup>	HEAT_FLUX_PER_AREA_INCH_POUND_FORCE_PER_SECOND_SQ_INCH
ft-lbf/s- ft <sup>2</sup>	HEAT_FLUX_PER_AREA_FOOT_POUND_FORCE_PER_SECOND_SQ_FOOT
BTU/hr- ft <sup>2</sup>	HEAT_FLUX_PER_AREA_BTU_PER_HOUR_SQ_FOOT
hp/ft <sup>2</sup>	HEAT_FLUX_PER_AREA_HORSEPOWER_P_PER_SQ_FOOT
W/m	HEAT_FLUX_PER_DISTANCE_WATT_PER_METER
kW/m	HEAT_FLUX_PER_DISTANCE_KILOWATT_PER_METER
mW/m	HEAT_FLUX_PER_DISTANCE_MICROWATT_PER_METER
mW/mm	HEAT_FLUX_PER_DISTANCE_MICROWATT_PER_MILLIMETER
in-lbf/s- in	HEAT_FLUX_PER_DISTANCE_INCH_POUND_FORCE_PER_SECOND_INCH
BTU/hr- ft	HEAT_FLUX_PER_DISTANCE_BTU_PER_HOUR_FOOT
hp/ft	HEAT_FLUX_PER_DISTANCE_HORSEPOWER_PER_FOOT
W/m <sup>3</sup>	HEAT_SOURCE_WATT_PER CU_METER
kW/m <sup>3</sup>	HEAT_SOURCE_KILOWATT_PER CU_METER
in-lbf/s- in <sup>3</sup>	HEAT_SOURCE_INCH_POUND_FORCE_PER_SECOND_CU_INCH
ft-lbf/s- ft <sup>3</sup>	HEAT_SOURCE_FOOT_POUND_FORCE_PER_SECOND_CU_FOOT
BTU/hr- ft <sup>3</sup>	HEAT_SOURCE_BTU_PER_HOUR_CU_FOOT
hp/ft <sup>3</sup>	HEAT_SOURCE_HORSEPOWER_PER CU_FOOT
lx	ILLUMINANCE_LUX

<b>Unit Abbreviation</b>	<b>Name</b>
m/s <sup>2</sup>	LINEAR_ACCELERATION_METER_PER_SQ_SECOND
km/s <sup>2</sup>	LINEAR_ACCELERATION_KILOMETER_PER_SQ_SECOND
mm/s <sup>2</sup>	LINEAR_ACCELERATION_MILLIMETER_PER_SQ_SECOND
cm/s <sup>2</sup>	LINEAR_ACCELERATION_CENTIMETER_PER_SQ_SECOND
in/s <sup>2</sup>	LINEAR_ACCELERATION_INCH_PER_SQ_SECOND
ft/s <sup>2</sup>	LINEAR_ACCELERATION FOOT_PER_SQ_SECOND
mi/s <sup>2</sup>	LINEAR_ACCELERATION_MILE_PER_SQ_SECOND
mi/hr <sup>2</sup>	LINEAR_ACCELERATION_MILE_PER_SQ_HOUR
km/hr <sup>2</sup>	LINEAR_ACCELERATION_KILOMETER_PER_SQ_HOUR
m/rad	LINEAR_PER_ANGULAR_METER_PER_RADIAN
m/rev	LINEAR_PER_ANGULAR_METER_PER_REVOLUTION
mm/rev	LINEAR_PER_ANGULAR_MILLIMETER_PER_REVOLUTION
in/rev	LINEAR_PER_ANGULAR_INCH_PER_REVOLUTION
ft/rev	LINEAR_PER_ANGULAR_FOOT_PER_REVOLUTION
m/s	LINEAR_VELOCITY_METER_PER_SECOND
mm/s	LINEAR_VELOCITY_MILLIMETER_PER_SECOND
cm/s	LINEAR_VELOCITY_CENTIMETER_PER_SECOND
km/s	LINEAR_VELOCITY_KILOMETER_PER_SECOND
km/hr	LINEAR_VELOCITY_KILOMETER_PER_HOUR
in/s	LINEAR_VELOCITY_INCH_PER_SECOND
ft/s	LINEAR_VELOCITY_FOOT_PER_SECOND
mi/s	LINEAR_VELOCITY_MILE_PER_SECOND
mi/hr	LINEAR_VELOCITY_MILE_PER_HOUR
lm	LUMINOUS_FLUX_LUMEN

<b>Unit Abbreviation</b>	<b>Name</b>
A/m	MAGNETIC_FIELD_STRENGTH_AMPERE_PER_METER
Wb	MAGNETIC_FLUX_WEBER
T	MAGNETIC_FLUX_DENSITY_TESLA
kg/s	MASS_FLOW_RATE_KILOGRAM_PER_SECOND
g/s	MASS_FLOW_RATE_GRAM_PER_SECOND
Mg/s	MASS_FLOW_RATE_MEGAGRAM_PER_SECOND
lbm/s	MASS_FLOW_RATE_POUND_MASS_PER_SECOND
slug/s	MASS_FLOW_RATE_SLUG_PER_SECOND
slinch/s	MASS_FLOW_RATE_SLING_PER_SECOND
kg-m <sup>2</sup>	MASS_MOMENT_OF_INERTIA_KILOGRAM_SQ_METER
kg-mm <sup>2</sup>	MASS_MOMENT_OF_INERTIA_KILOGRAM_SQ_MILLIMETER
g-mm <sup>2</sup>	MASS_MOMENT_OF_INERTIA_GRAM_SQ_MILLIMETER
g-cm <sup>2</sup>	MASS_MOMENT_OF_INERTIA_GRAM_SQ_CENTIMETER
slug-ft <sup>2</sup>	MASS_MOMENT_OF_INERTIA_SLUG_SQ FOOT
slug-in <sup>2</sup>	MASS_MOMENT_OF_INERTIA_SLUG_SQ_INCH
slinch- in <sup>2</sup>	MASS_MOMENT_OF_INERTIA_SLING_SQ_INCH
lbm-in <sup>2</sup>	MASS_MOMENT_OF_INERTIA_POUND_MASS_SQ_INCH
lbm-ft <sup>2</sup>	MASS_MOMENT_OF_INERTIA_POUND_MASS_SQ FOOT
kg/m <sup>2</sup>	MASS_PER_AREA_KILOGRAM_PER_SQ_METER
kg/mm <sup>2</sup>	MASS_PER_AREA_KILOGRAM_PER_SQ_MILLIMETER
g/mm <sup>2</sup>	MASS_PER_AREA_GRAM_PER_SQ_MILLIMETER
g/cm <sup>2</sup>	MASS_PER_AREA_GRAM_PER_SQ_CENTIMETER
slug/in <sup>2</sup>	MASS_PER_AREA_SLUG_PER_SQ_INCH
slug/ft <sup>2</sup>	MASS_PER_AREA_SLUG_PER_SQ FOOT

<b>Unit Abbreviation</b>	<b>Name</b>
sinch/in <sup>2</sup>	MASS_PER_AREA_SLINCH_PER_SQ_INCH
lbm/in <sup>2</sup>	MASS_PER_AREA_POUND_MASS_PER_SQ_INCH
lbm/ft <sup>2</sup>	MASS_PER_AREA_POUND_MASS_PER_SQ FOOT
kg/m	MASS_PER_LENGTH_KILOGRAM_PER_METER
kg/mm	MASS_PER_LENGTH_KILOGRAM_PER_MILLIMETER
g/mm	MASS_PER_LENGTH_GRAM_PER_MILLIMETER
g/cm	MASS_PER_LENGTH_GRAM_PER_CENTIMETER
slug/in	MASS_PER_LENGTH_SLUG_PER_INCH
slug/ft	MASS_PER_LENGTH_SLUG_PER_FOOT
sinch/in	MASS_PER_LENGTH_SLINCH_PER_INCH
lbm/in	MASS_PER_LENGTH_POUND_MASS_PER_INCH
lbm/ft	MASS_PER_LENGTH_POUND_MASS_PER_FOOT
kg-m/s	MOMENTUM_KILOGRAM_METER_PER_SECOND
/m	PER_DISTANCE_PER_METER
/nm	PER_DISTANCE_PER_NANOMETER
/mm	PER_DISTANCE_PER_MILLIMETER
/cm	PER_DISTANCE_PER_CENTIMETER
/km	PER_DISTANCE_PER_KILOMETER
/in	PER_DISTANCE_PER_INCH
/ft	PER_DISTANCE_PER_FOOT
/yd	PER_DISTANCE_PER_YARD
/mi	PER_DISTANCE_PER_MILE
/tenth	PER_DISTANCE_PER_TENTH
/hundredth	PER_DISTANCE_PER_HUNDREDTH
/mil	PER_DISTANCE_PER_MIL

<b>Unit Abbreviation</b>	<b>Name</b>
W	POWER_WATT
kW	POWER_KILOWATT
mW	POWER_MICROWATT
in-lbf/s	POWER_INCH_POUND_FORCE_PER_SECOND
ft-lbf/s	POWER_FOOT_POUND_FORCE_PER_SECOND
BTU/hr	POWER_BTU_PER_HOUR
hp	POWER_HORSEPOWER
C	ELECTRIC_CHARGE_COULOMB
W/sr	RADIANT_INTENSITY_WATT_PER_STERADIAN
N- m/rad	ROTATIONAL_STIFFNESS_NEWTON_METER_PER_RADIAN
N- m/deg	ROTATIONAL_STIFFNESS_NEWTON_METER_PER_DEGREE
N- mm/rad	ROTATIONAL_STIFFNESS_NEWTON_MILLIMETER_PER_RADIANS
N- mm/deg	ROTATIONAL_STIFFNESS_NEWTON_MILLIMETER_PER_DEGREE
kN- m/rad	ROTATIONAL_STIFFNESS_KILONEWTON_METER_PER_RADIANS
kN- m/deg	ROTATIONAL_STIFFNESS_KILONEWTON_METER_PER_DEGREE
lbf- in/rad	ROTATIONAL_STIFFNESS_POUND_FORCE_INCH_PER_RADIANS
lbf- in/deg	ROTATIONAL_STIFFNESS_POUND_FORCE_INCH_PER_DEGREE
lbf- ft/rad	ROTATIONAL_STIFFNESS_POUND_FORCE FOOT_PER_RADIANS
lbf- ft/deg	ROTATIONAL_STIFFNESS_POUND_FORCE FOOT_PER_DEGREE
m <sup>4</sup>	SECOND_MOMENT_OF_AREA_METER_TO_FOURTH

<b>Unit Abbreviation</b>	<b>Name</b>
mm <sup>4</sup>	SECOND_MOMENT_OF_AREA_MILLIMETER_TO_FOURTH
cm <sup>4</sup>	SECOND_MOMENT_OF_AREA_CENTIMETER_TO_FOURTH
in <sup>4</sup>	SECOND_MOMENT_OF_AREA_INCH_TO_FOURTH
ft <sup>4</sup>	SECOND_MOMENT_OF_AREA FOOT_TO_FOURTH
W/m-C	THERMAL_CONDUCTIVITY_WATT_PER_METER_CELCIUS
kW/m- C	THERMAL_CONDUCTIVITY_KILOWATT_PER_METER_CELCIUS
BTU/hr- ft-F	THERMAL_CONDUCTIVITY_BTU_PER_HOUR_FAHRENHEIT
in-lbf/s- in-F	THERMAL_CONDUCTIVITY_INCH_POUND_FORCE_PER_SECOND_INCH_FAHRENHEIT
Pa-s	DYNAMIC_VISCOSITY_PASCAL_SECOND
kPa-s	DYNAMIC_VISCOSITY_KIOPASCAL_SECOND
MPa-s	DYNAMIC_VISCOSITY_MEGAPASCAL_SECOND
lbf-s/in <sup>2</sup>	DYNAMIC_VISCOSITY_POUND_FORCE_SECOND_PER_SQ_INCH
m <sup>2</sup> /s	KINEMATIC_VISCOSITY_SQ_METER_PER_SECOND
mm <sup>2</sup> /s	KINEMATIC_VISCOSITY_SQ_MILLIMETER_PER_SECOND
cm <sup>2</sup> /s	KINEMATIC_VISCOSITY_SQ_CENTIMETER_PER_SECOND
in <sup>2</sup> /s	KINEMATIC_VISCOSITY_SQ_INCH_PER_SECOND
ft <sup>2</sup> /s	KINEMATIC_VISCOSITY_SQ FOOT_PER_SECOND
m <sup>3</sup>	VOLUME CU_METER
mm <sup>3</sup>	VOLUME CU_MILLIMETER
L	VOLUME_LITER
mL	VOLUME_MILLILITER
in <sup>3</sup>	VOLUME CU_INCH

<b>Unit Abbreviation</b>	<b>Name</b>
ft <sup>3</sup>	VOLUME_CU FOOT
yd <sup>3</sup>	VOLUME_CU YARD
gallon	VOLUME_GALLON
quart	VOLUME_QUART
pint	VOLUME_PINT
ounce	VOLUME_FLUID_OUNCE
	UNIT_NOT_SET
	SCALAR_NULL
m <sup>3</sup> /s	VOLUME_FLOW_RATE CU METER PER SECOND
mm <sup>3</sup> /s	VOLUME_FLOW_RATE CU MILLIMETER PER SECOND
L/s	VOLUME_FLOW_RATE LITER PER SECOND
mL/s	VOLUME_FLOW_RATE MILLILITER PER SECOND
in <sup>3</sup> /s	VOLUME_FLOW_RATE CU INCH PER SECOND
ft <sup>3</sup> /s	VOLUME_FLOW_RATE CU FOOT PER SECOND
yd <sup>3</sup> /s	VOLUME_FLOW_RATE CU YARD PER SECOND
gallon/s	VOLUME_FLOW_RATE GALLON PER SECOND
gallon/min	VOLUME_FLOW_RATE GALLON PER MINUTE
H	ELECTRICAL_INDUCTANCE_HENRY
°	ANGLE_DEGREE_SYMBOL
'	ANGLE_MINUTE_SYMBOL
"	ANGLE_SECOND_SYMBOL
'	DISTANCE_FOOT_SYMBOL
"	DISTANCE_INCH_SYMBOL
hectare	AREA_HECTARE
N/mm <sup>2</sup>	FORCE_PER_AREA_NEWTON_PER_SQ_MILLIMETER

<b>Unit Abbreviation</b>	<b>Name</b>
P	DYNAMIC_VISCOSITY_POISE
cP	DYNAMIC_VISCOSITY_CENTIPOISE
cm <sup>3</sup>	VOLUME CU CENTIMETER
lbm- ft <sup>2</sup> /s	ANGULAR_MOMENTUM_POUND_MASS_SQ_FOOT_PER_SECOND
V/ft	ELECTRICAL_FIELD_STRENGTH_VOLT_PER_FOOT
lbm-ft/s	MOMENTUM_POUND_MASS_FOOT_PER_SECOND
A/ft	MAGNETIC_FIELD_STRENGTH_AMPERE_PER_FOOT
m <sup>3</sup> /min	VOLUME_FLOW_RATE_CU_METER_PER_MINUTE
m <sup>3</sup> /hr	VOLUME_FLOW_RATE_CU_METER_PER_HOUR
Pa/m	FORCE_PER_AREA_PASCAL_PER_METER
mPa/m	FORCE_PER_AREA_MILLIPASCAL_PER_METER
kPa/m	FORCE_PER_AREA_KILOPASCAL_PER_METER
MPa/m	FORCE_PER_AREA_MEGAPASCAL_PER_METER
psi/in	FORCE_PER_AREA_POUND_FORCE_PER_SQ_INCH_PER_INCH
ksi/in	FORCE_PER_AREA_KIP_PER_SQ_INCH_PER_INCH
psf/ft	FORCE_PER_AREA_POUND_FORCE_PER_SQ_FOOT_PER_FOOT
ksf/ft	FORCE_PER_AREA_KIP_PER_SQ_FOOT_PER_FOOT
bar/m	FORCE_PER_AREA_BAR_PER_METER
mbar/m	FORCE_PER_AREA_MILLIBAR_PER_METER
atm/m	FORCE_PER_AREA_ATMOSPHERE_PER_METER
N/mm <sup>3</sup>	FORCE_PER_AREA_NEWTON_PER_CU_MILLIMETER
mmw/m	FORCE_PER_AREA_MILLIMETERS_OF_WATER_PER_METER
inw/ft	FORCE_PER_AREA_INCHES_OF_WATER_PER_FOOT

<b>Unit Abbreviation</b>	<b>Name</b>
mmw	FORCE_PER_AREA_MILLIMETERS_OF_WATER
inw	FORCE_PER_AREA_INCHES_OF_WATER
N-m	MOMENT_NEWTON_METER
DN-m	MOMENT_DECA_NEWTON_METER
HN-m	MOMENT_HECTO_NEWTON_METER
kN-m	MOMENT_KILO_NEWTON_METER
MN-m	MOMENT_MEGA_NEWTON_METER
TN-m	MOMENT_TERA_NEWTON_METER
kgf-m	MOMENT_KILOGRAM_FORCE_METER
tonnef- m	MOMENT_TONNE_FORCE_METER
lb-ft	MOMENT_POUND_FOOT
lb-in	MOMENT_POUND_INCH
tonuk-ft	MOMENT_TON_UK_FOOT
tonus-ft	MOMENT_TON_US_FOOT
m <sup>3</sup>	FIRST_MOMENT_OF_AREA_METER_TO_THIRD
mm <sup>3</sup>	FIRST_MOMENT_OF_AREA_MILLIMETER_TO_THIRD
cm <sup>3</sup>	FIRST_MOMENT_OF_AREA_CENTIMETER_TO_THIRD
in <sup>3</sup>	FIRST_MOMENT_OF_AREA_INCH_TO_THIRD
ft <sup>3</sup>	FIRST_MOMENT_OF_AREA_FOOT_TO_THIRD
m <sup>6</sup>	TORSIONAL_WARPING_CONSTANT_METER_TO_SIXTH
mm <sup>6</sup>	TORSIONAL_WARPING_CONSTANT_MILLIMETER_TO_SIXTH
cm <sup>6</sup>	TORSIONAL_WARPING_CONSTANT_CENTIMETER_TO_SIXTH
in <sup>6</sup>	TORSIONAL_WARPING_CONSTANT_INCH_TO_SIXTH
ft <sup>6</sup>	TORSIONAL_WARPING_CONSTANT_FOOT_TO_SIXTH

<b>Unit Abbreviation</b>	<b>Name</b>
L/min	VOLUME_FLOW_RATE_LITER_PER_MINUTE
ft <sup>3</sup> /min	VOLUME_FLOW_RATE_CU FOOT_PER_MINUTE
ft/min	LINEAR_VELOCITY_FOOT_PER_MINUTE
ftnt	TIME_FORTNIGHT
rad	SLOPE_ANGLE_RADIAN
deg	SLOPE_ANGLE_DEGREE
min	SLOPE_ANGLE_MINUTE
sec	SLOPE_ANGLE_SECOND
%	SLOPE_PERCENT
%o	SLOPE_PER_THOUSAND
/	SLOPE_RATIO_SEPARATOR
m / m	SLOPE_RATIO_METER_IN_METER
cm / m	SLOPE_RATIO_CENTIMETER_IN_METER
cm / cm	SLOPE_RATIO_CENTIMETER_IN_CENTIMETER
mm / m	SLOPE_RATIO_MILLIMETER_IN_METER
mm / cm	SLOPE_RATIO_MILLIMETER_IN_CENTIMETER
mm / mm	SLOPE_RATIO_MILLIMETER_IN_MILLIMETER
yd / yd	SLOPE_RATIO_YARD_IN_YARD
ft / yd	SLOPE_RATIO FOOT_IN_YARD
ft / ft	SLOPE_RATIO_FOOT_IN_FOOT
in / yd	SLOPE_RATIO_INCH_IN_YARD
in / ft	SLOPE_RATIO_INCH_IN_FOOT
in / in	SLOPE_RATIO_INCH_IN_INCH
ea	ENUM_EACH
/tn	ENUM_PER_TEN

<b>Unit Abbreviation</b>	<b>Name</b>
%	ENUM_PER_HUNDRED
%	ENUM_PERCENT
%o	ENUM_PER_THOUSAND
tn	ENUM_TEN
cn	ENUM_HUNDRED
th	ENUM_THOUSAND
dz	ENUM_DOZEN
/dz	ENUM_PER_DOZEN
mm/rad	LINEAR_PER_ANGULAR_MILLIMETER_PER_RADIAN
m/deg	LINEAR_PER_ANGULAR_METER_PER_DEGREE
mm/deg	LINEAR_PER_ANGULAR_MILLIMETER_PER_DEGREE
in/deg	LINEAR_PER_ANGULAR_INCH_PER_DEGREE
Pag	FORCE_PER_AREA_PASCAL_GAUGE
mPag	FORCE_PER_AREA_MILLIPASCAL_GAUGE
kPag	FORCE_PER_AREA_KILOPASCAL_GAUGE
MPag	FORCE_PER_AREA_MEGAPASCAL_GAUGE
psig	FORCE_PER_AREA_POUND_FORCE_PER_SQ_INCH_GAUGE
ksig	FORCE_PER_AREA_KIP_PER_SQ_INCH_GAUGE
psfg	FORCE_PER_AREA_POUND_FORCE_PER_SQ FOOT_GAUGE
ksfg	FORCE_PER_AREA_KIP_PER_SQ FOOT_GAUGE
barg	FORCE_PER_AREA_BAR_GAUGE
mbarg	FORCE_PER_AREA_MILLIBAR_GAUGE
N/mm <sup>2</sup> g	FORCE_PER_AREA_NEWTON_PER_SQ_MILLIMETER_GAUGE

<b>Unit Abbreviation</b>	<b>Name</b>
mmwg	FORCE_PER_AREA_MILLIMETERS_OF_WATER_GAUGE
inwg	FORCE_PER_AREA_INCHES_OF_WATER_GAUGE
in	NPD_INCH
mm	NPD_MILLIMETER
N·m/m	MOMENT_PER_DISTANCE_NEWTON_METER_PER_METER
N· m/mm	MOMENT_PER_DISTANCE_NEWTON_METER_PER_MILLIMETER
N· mm/m	MOMENT_PER_DISTANCE_NEWTON_MILLIMETER_PER_METER
kN· m/mm	MOMENT_PER_DISTANCE_KILONEWTON_METER_PER_MILLIMETER
kN· mm/m	MOMENT_PER_DISTANCE_KILONEWTON_MILLIMETER_PER_METER
lbf·ft/in	MOMENT_PER_DISTANCE_POUND_FORCE_FOOT_PER_INCH
lbf·in/in	MOMENT_PER_DISTANCE_POUND_FORCE_INCH_PER_INCH
lbf·ft/ft	MOMENT_PER_DISTANCE_POUND_FORCE_FOOT_PER_FOOT
lbf·in/ft	MOMENT_PER_DISTANCE_POUND_FORCE_INCH_PER_FOOT
kip·ft/ft	MOMENT_PER_DISTANCE_KIP_FORCE_FOOT_PER_FOOT
kip·ft/in	MOMENT_PER_DISTANCE_KIP_FORCE_FOOT_PER_INCH
kip·in/ft	MOMENT_PER_DISTANCE_KIP_FORCE_INCH_PER_FOOT
kip·in/in	MOMENT_PER_DISTANCE_KIP_FORCE_INCH_PER_INCH
AWG	WIRE_GAUGE_AWG
mm	WIRE_GAUGE_MILLIMETER
in	WIRE_GAUGE_INCH

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<b>Unit Abbreviation</b>	<b>Name</b>
mil	WIRE_GAUGE_MIL
cmil	WIRE_GAUGE_CIRCULAR_MIL
kcmil	WIRE_GAUGE_KILO_CIRCULAR_MIL
mm <sup>2</sup>	WIRE_GAUGE_SQUARE_MILLIMETER
native	NPD_NATIVE_INCH
native	NPD_NATIVE

### Unit Names to Abbreviations

<b>Unit Name</b>	<b>Abbreviation</b>
DISTANCE_METER	m
DISTANCE_NANOMETER	nm
DISTANCE_MILLIMETER	mm
DISTANCE_CENTIMETER	cm
DISTANCE_KILOMETER	km
DISTANCE_INCH	in
DISTANCE_FOOT	ft
DISTANCE_YARD	yd
DISTANCE_MILE	mi
DISTANCE_TENTH	tenth
DISTANCE_HUNDREDTH	hundredth
DISTANCE_THOUSANDTH	thousandth
DISTANCE_ROD	rod
DISTANCE_POLE	pole
DISTANCE_LINK	link
DISTANCE_CHAIN	chain
DISTANCE_POINT	pt

<b>Unit Name</b>	<b>Abbreviation</b>
DISTANCE_FURLONG	furlong
ANGLE_RADIAN	rad
ANGLE_DEGREE	deg
ANGLE_MINUTE	min
ANGLE_SECOND	sec
ANGLE_GRADIAN	gr
ANGLE_REVOLUTION	rev
MASS_KILOGRAM	kg
MASS_GRAM	g
MASS_MILLIGRAM	mg
MASS_MEGAGRAM	Mg
MASS_GRAIN	grain
MASS_SLUG	slug
MASS_POUND_MASS	lbm
MASS_SLING	slinch
MASS_OUNCE	oz
MASS_METRIC_TON	tonne
MASS_LONG_TON	ton
MASS_SHORT_TON	net-ton
TIME_SECOND	sec
TIME_MINUTE	min
TIME_HOUR	hr
TIME_DAY	day
TIME_WEEK	wk
TIME_YEAR	yr

<b>Unit Name</b>	<b>Abbreviation</b>
TIME_MILLISECOND	ms
TIME_NANOSECOND	ns
TEMPERATURE_KELVIN	K
TEMPERATURE_FAHRENHEIT	F
TEMPERATURE_CELCIUS	C
TEMPERATURE_RANKINE	R
ELECTRIC_CURRENT_AMPERE	A
LUMINOUS_INTENSITY_CANDELA	cd
AMOUNT_OF_SUBSTANCE_MOLE	mol
SOLID_ANGLE_STERADIAN	sr
ANGULAR_ACCELERATION_RADIANT_PER_SQ_SECOND	rad/s <sup>2</sup>
ANGULAR_ACCELERATION_DEGREE_PER_SQ_SECOND	deg/s <sup>2</sup>
ANGULAR_ACCELERATION_CYCLE_PER_SQ_SECOND	Hz/s
ANGULAR_MOMENTUM_KILOGRAM_SQ_METER_PER_SECOND	kg·m <sup>2</sup> /s
ANGULAR_VELOCITY_RADIANT_PER_SECOND	rad/s
ANGULAR_VELOCITY_RADIANT_PER_MINUTE	rad/min
ANGULAR_VELOCITY_RADIANT_PER_HOUR	rad/hr
ANGULAR_VELOCITY_CYCLE_PER_SECOND	Hz
ANGULAR_VELOCITY_CYCLE_PER_MINUTE	rpm
ANGULAR_VELOCITY_CYCLE_PER_HOUR	rph
ANGULAR_VELOCITY_DEGREE_PER_SECOND	deg/s
ANGULAR_VELOCITY_DEGREE_PER_MINUTE	deg/m
ANGULAR_VELOCITY_DEGREE_PER_HOUR	deg/hr
AREA_SQUARE_METER	m <sup>2</sup>
AREA_SQUARE_MILLIMETER	mm <sup>2</sup>

<b>Unit Name</b>	<b>Abbreviation</b>
AREA_SQUARE_CENTIMETER	cm <sup>2</sup>
AREA_SQUARE_KILOMETER	km <sup>2</sup>
AREA_SQUARE_INCH	in <sup>2</sup>
AREA_SQUARE_FOOT	ft <sup>2</sup>
AREA_SQUARE_YARD	yd <sup>2</sup>
AREA_SQUARE_MILE	mi <sup>2</sup>
AREA_SQUARE_ACRE	ac
AREA_ACRE	ac
BODY_FORCE_NEUTON_PER CU METER	N/m <sup>3</sup>
BODY_FORCE_NEUTON_PER CU CENTIMETER	N/cm <sup>3</sup>
BODY_FORCE_NEUTON_PER CU MILLIMETER	N/mm <sup>3</sup>
BODY_FORCE_KILONEUTON_PER CU METER	kN/m <sup>3</sup>
BODY_FORCE_POUND_FORCE_PER CU INCH	lbf/in <sup>3</sup>
BODY_FORCE_POUND_FORCE_PER CU FOOT	lbf/ft <sup>3</sup>
COEFFICIENT_OF_THERMAL_EXPANSION_PER KELVIN	/K
COEFFICIENT_OF_THERMAL_EXPANSION_PER CELCIUS	/C
COEFFICIENT_OF_THERMAL_EXPANSION_PER FAHRENHEIT	/F
COEFFICIENT_OF_THERMAL_EXPANSION_PER RANKINE	/R
DENSITY_KILOGRAM_PER CU METER	kg/m <sup>3</sup>
DENSITY_KILOGRAM_PER CU MILLIMETER	kg/mm <sup>3</sup>
DENSITY_KILOGRAM_PER CU CENTIMETER	kg/cm <sup>3</sup>
DENSITY_POUND_MASS_PER CU FOOT	lbm/ft <sup>3</sup>
DENSITY_POUND_MASS_PER CU INCH	lbm/in <sup>3</sup>
DENSITY_SLUG_PER CU FOOT	slug/ft <sup>3</sup>
DENSITY_SLINCH_PER CU INCH	slinch/in <sup>3</sup>

<b>Unit Name</b>	<b>Abbreviation</b>
ELECTRICAL_CAPACITANCE_FARAD	F
ELECTRICAL_CONDUCTANCE_SIEMENS	S
ELECTRICAL_FIELD_STRENGTH_VOLT_PER_METER	V/m
ELECTRICAL_POTENTIAL_VOLT	V
ELECTRICAL_RESISTANCE_OHM	ohm
ENERGY_JOULE	J
ENERGY_MICRO_JOULE	mJ
ENERGY_KILOJOULE	kJ
ENERGY_WATT_SECOND	W-s
ENERGY_WATT_HOUR	W-hr
ENERGY_KILOWATT_HOUR	kW-hr
ENERGY_INCH_POUND_FORCE	in-lbf
ENERGY FOOT_POUND_FORCE	ft-lbf
ENERGY_BTU	BTU
ENERGY_ERG	erg
ENERGY_ELECTRON_VOLT	eV
ENTHROPY_JOULE_PER_KELVIN	J/K
FILM_COEFFICIENT_WATT_PER_SQ_METER_KELVIN	W/m <sup>2</sup> -K
FILM_COEFFICIENT_BTU_PER_HOUR_SQ_FOOT_FAHRENHEIT	BTU/hr- ft <sup>2</sup> F
FILM_COEFFICIENT_FOOT_POUND_PER_SQ_FOOT_FAHRENHEIT	ft- lbf/ft <sup>2</sup> F
FILM_COEFFICIENT_INCH_POUND_PER_SQ_INCH_FAHRENHEIT	in- lbf/in <sup>2</sup> F
FORCE_NEWTON	N
FORCE_NANONEWTON	nN
FORCE_MILLINEWTON	mN
FORCE_KILONEWTON	kN

<b>Unit Name</b>	<b>Abbreviation</b>
FORCE_POUND_FORCE	lbf
FORCE_DYNE	dyne
FORCE_KIP	kip
FORCE_PER_AREA_PASCAL	Pa
FORCE_PER_AREA_MILLIPASCAL	mPa
FORCE_PER_AREA_KILOPASCAL	kPa
FORCE_PER_AREA_MEGAPASCAL	MPa
FORCE_PER_AREA_POUND_FORCE_PER_SQ_INCH	psi
FORCE_PER_AREA_KIP_PER_SQ_INCH	ksi
FORCE_PER_AREA_POUND_FORCE_PER_SQ_FOOT	psf
FORCE_PER_AREA_KIP_PER_SQ_FOOT	ksf
FORCE_PER_AREA_BAR	bar
FORCE_PER_AREA_MILLIBAR	mbar
FORCE_PER_AREA_ATMOSPHERE	atm
FORCE_PER_DISTANCE_NEWTON_PER_METER	N/m
FORCE_PER_DISTANCE_NEWTON_PER_MILLIMETER	N/mm
FORCE_PER_DISTANCE_NEWTON_PER_CENTIMETER	N/cm
FORCE_PER_DISTANCE_KILONEWTON_PER_METER	kN/m
FORCE_PER_DISTANCE_POUND_FORCE_PER_INCH	lbf/in
FORCE_PER_DISTANCE_POUND_FORCE_PER_FOOT	lbf/ft
FORCE_PER_DISTANCE_KIP_PER_INCH	kpi
FORCE_PER_DISTANCE_KIP_PER_FOOT	kpf
FORCE_PER_DISTANCE_DYNE_PER_METER	dyne/m
FORCE_PER_DISTANCE_DYNE_PER_MILLIMETER	dyne/mm
FREQUENCY_PER_SECOND	/sec

<b>Unit Name</b>	<b>Abbreviation</b>
FREQUENCY_PER_MINUTE	/min
FREQUENCY_PER_HOUR	/hr
HEAT_CAPACITY_JOULE_PER_KILOGRAM_KELVIN	J/kg-K
HEAT_CAPACITY_BTU_PER_POUND_MASS_FAHRENHEIT	BTU/lbm-F
HEAT_FLUX_PER_AREA_WATT_PER_SQ_METER	W/m <sup>2</sup>
HEAT_FLUX_PER_AREA_KILOWATT_PER_SQ_METER	kW/m <sup>2</sup>
HEAT_FLUX_PER_AREA_INCH_POUND_FORCE_PER_SECOND_S_Q_INCH	in-lbf/s- in <sup>2</sup>
HEAT_FLUX_PER_AREA_FOOT_POUND_FORCE_PER_SECOND_S_Q_FOOT	ft-lbf/s- ft <sup>2</sup>
HEAT_FLUX_PER_AREA_BTU_PER_HOUR_SQ_FOOT	BTU/hr- ft <sup>2</sup>
HEAT_FLUX_PER_AREA_HORSEPOWER_P_PER_SQ_FOOT	hp/ft <sup>2</sup>
HEAT_FLUX_PER_DISTANCE_WATT_PER_METER	W/m
HEAT_FLUX_PER_DISTANCE_KILOWATT_PER_METER	kW/m
HEAT_FLUX_PER_DISTANCE_MICROWATT_PER_METER	mW/m
HEAT_FLUX_PER_DISTANCE_MICROWATT_PER_MILLIMETER	mW/mm
HEAT_FLUX_PER_DISTANCE_INCH_POUND_FORCE_PER_SECOND_D_INCH	in-lbf/s- in
HEAT_FLUX_PER_DISTANCE_BTU_PER_HOUR_FOOT	BTU/hr- ft
HEAT_FLUX_PER_DISTANCE_HORSEPOWER_PER_FOOT	hp/ft
HEAT_SOURCE_WATT_PER CU_METER	W/m <sup>3</sup>
HEAT_SOURCE_KILOWATT_PER CU_METER	kW/m <sup>3</sup>
HEAT_SOURCE_INCH_POUND_FORCE_PER_SECOND CU_INCH	in-lbf/s- in <sup>3</sup>
HEAT_SOURCE_FOOT_POUND_FORCE_PER_SECOND CU_FOOT	ft-lbf/s- ft <sup>3</sup>
HEAT_SOURCE_BTU_PER_HOUR CU_FOOT	BTU/hr- ft <sup>3</sup>
HEAT_SOURCE_HORSEPOWER_PER CU_FOOT	hp/ft <sup>3</sup>

<b>Unit Name</b>	<b>Abbreviation</b>
ILLUMINANCE_LUX	lx
LINEAR_ACCELERATION_METER_PER_SQ_SECOND	m/s <sup>2</sup>
LINEAR_ACCELERATION_KILOMETER_PER_SQ_SECOND	km/s <sup>2</sup>
LINEAR_ACCELERATION_MILLIMETER_PER_SQ_SECOND	mm/s <sup>2</sup>
LINEAR_ACCELERATION_CENTIMETER_PER_SQ_SECOND	cm/s <sup>2</sup>
LINEAR_ACCELERATION_INCH_PER_SQ_SECOND	in/s <sup>2</sup>
LINEAR_ACCELERATION_FOOT_PER_SQ_SECOND	ft/s <sup>2</sup>
LINEAR_ACCELERATION_MILE_PER_SQ_SECOND	mi/s <sup>2</sup>
LINEAR_ACCELERATION_MILE_PER_SQ_HOUR	mi/hr <sup>2</sup>
LINEAR_ACCELERATION_KILOMETER_PER_SQ_HOUR	km/hr <sup>2</sup>
LINEAR_PER_ANGULAR_METER_PER_RADIAN	m/rad
LINEAR_PER_ANGULAR_METER_PER_REVOLUTION	m/rev
LINEAR_PER_ANGULAR_MILLIMETER_PER_REVOLUTION	mm/rev
LINEAR_PER_ANGULAR_INCH_PER_REVOLUTION	in/rev
LINEAR_PER_ANGULAR_FOOT_PER_REVOLUTION	ft/rev
LINEAR_VELOCITY_METER_PER_SECOND	m/s
LINEAR_VELOCITY_MILLIMETER_PER_SECOND	mm/s
LINEAR_VELOCITY_CENTIMETER_PER_SECOND	cm/s
LINEAR_VELOCITY_KILOMETER_PER_SECOND	km/s
LINEAR_VELOCITY_KILOMETER_PER_HOUR	km/hr
LINEAR_VELOCITY_INCH_PER_SECOND	in/s
LINEAR_VELOCITY_FOOT_PER_SECOND	ft/s
LINEAR_VELOCITY_MILE_PER_SECOND	mi/s
LINEAR_VELOCITY_MILE_PER_HOUR	mi/hr
LUMINOUS_FLUX_LUMEN	lm

<b>Unit Name</b>	<b>Abbreviation</b>
MAGNETIC_FIELD_STRENGTH_AMPERE_PER_METER	A/m
MAGNETIC_FLUX_WEBER	Wb
MAGNETIC_FLUX_DENSITY_TESLA	T
MASS_FLOW_RATE_KILOGRAM_PER_SECOND	kg/s
MASS_FLOW_RATE_GRAM_PER_SECOND	g/s
MASS_FLOW_RATE_MEGAGRAM_PER_SECOND	Mg/s
MASS_FLOW_RATE_POUND_MASS_PER_SECOND	lbm/s
MASS_FLOW_RATE_SLUG_PER_SECOND	slug/s
MASS_FLOW_RATE_SLINCH_PER_SECOND	slinch/s
MASS_MOMENT_OF_INERTIA_KILOGRAM_SQ_METER	kg-m <sup>2</sup>
MASS_MOMENT_OF_INERTIA_KILOGRAM_SQ_MILLIMETER	kg-mm <sup>2</sup>
MASS_MOMENT_OF_INERTIA_GRAM_SQ_MILLIMETER	g-mm <sup>2</sup>
MASS_MOMENT_OF_INERTIA_GRAM_SQ_CENTIMETER	g-cm <sup>2</sup>
MASS_MOMENT_OF_INERTIA_SLUG_SQ_FOOT	slug-ft <sup>2</sup>
MASS_MOMENT_OF_INERTIA_SLUG_SQ_INCH	slug-in <sup>2</sup>
MASS_MOMENT_OF_INERTIA_SLINCH_SQ_INCH	slinch- in <sup>2</sup>
MASS_MOMENT_OF_INERTIA_POUND_MASS_SQ_INCH	lbm-in <sup>2</sup>
MASS_MOMENT_OF_INERTIA_POUND_MASS_SQ_FOOT	lbm-ft <sup>2</sup>
MASS_PER_AREA_KILOGRAM_PER_SQ_METER	kg/m <sup>2</sup>
MASS_PER_AREA_KILOGRAM_PER_SQ_MILLIMETER	kg/mm <sup>2</sup>
MASS_PER_AREA_GRAM_PER_SQ_MILLIMETER	g/mm <sup>2</sup>
MASS_PER_AREA_GRAM_PER_SQ_CENTIMETER	g/cm <sup>2</sup>
MASS_PER_AREA_SLUG_PER_SQ_INCH	slug/in <sup>2</sup>
MASS_PER_AREA_SLUG_PER_SQ_FOOT	slug/ft <sup>2</sup>
MASS_PER_AREA_SLINCH_PER_SQ_INCH	slinch/in <sup>2</sup>

<b>Unit Name</b>	<b>Abbreviation</b>
MASS_PER_AREA_POUND_MASS_PER_SQ_INCH	lbm/in <sup>2</sup>
MASS_PER_AREA_POUND_MASS_PER_SQ FOOT	lbm/ft <sup>2</sup>
MASS_PER_LENGTH_KILOGRAM_PER_METER	kg/m
MASS_PER_LENGTH_KILOGRAM_PER_MILLIMETER	kg/mm
MASS_PER_LENGTH_GRAM_PER_MILLIMETER	g/mm
MASS_PER_LENGTH_GRAM_PER_CENTIMETER	g/cm
MASS_PER_LENGTH_SLUG_PER_INCH	slug/in
MASS_PER_LENGTH_SLUG_PER_FOOT	slug/ft
MASS_PER_LENGTH_SLINGER_PER_INCH	sling/in
MASS_PER_LENGTH_POUND_MASS_PER_INCH	lbm/in
MASS_PER_LENGTH_POUND_MASS_PER_FOOT	lbm/ft
MOMENTUM_KILOGRAM_METER_PER_SECOND	kg-m/s
PER_DISTANCE_PER_METER	/m
PER_DISTANCE_PER_NANOMETER	/nm
PER_DISTANCE_PER_MILLIMETER	/mm
PER_DISTANCE_PER_CENTIMETER	/cm
PER_DISTANCE_PER_KILOMETER	/km
PER_DISTANCE_PER_INCH	/in
PER_DISTANCE_PER_FOOT	/ft
PER_DISTANCE_PER_YARD	/yd
PER_DISTANCE_PER_MILE	/mi
PER_DISTANCE_PER_TENTH	/tenth
PER_DISTANCE_PER_HUNDREDTH	/hundredth
PER_DISTANCE_PER_MIL	/mil
POWER_WATT	W

<b>Unit Name</b>	<b>Abbreviation</b>
POWER_KILOWATT	kW
POWER_MICROWATT	mW
POWER_INCH_POUND_FORCE_PER_SECOND	in-lbf/s
POWER_FOOT_POUND_FORCE_PER_SECOND	ft-lbf/s
POWER_BTU_PER_HOUR	BTU/hr
POWER_HORSEPOWER	hp
ELECTRIC_CHARGE_COULOMB	C
RADIANT_INTENSITY_WATT_PER_STERADIAN	W/sr
ROTATIONAL_STIFFNESS_NEWTON_METER_PER_RADIAN	N- m/rad
ROTATIONAL_STIFFNESS_NEWTON_METER_PER_DEGREE	N- m/deg
ROTATIONAL_STIFFNESS_NEWTON_MILLIMETER_PER_RADIAN	N- mm/rad
ROTATIONAL_STIFFNESS_NEWTON_MILLIMETER_PER_DEGREE	N- mm/deg
ROTATIONAL_STIFFNESS_KILONEWTON_METER_PER_RADIAN	kN- m/rad
ROTATIONAL_STIFFNESS_KILONEWTON_METER_PER_DEGREE	kN- m/deg
ROTATIONAL_STIFFNESS_POUND_FORCE_INCH_PER_RADIAN	lbf- in/rad
ROTATIONAL_STIFFNESS_POUND_FORCE_INCH_PER_DEGREE	lbf- in/deg
ROTATIONAL_STIFFNESS_POUND_FORCE_FOOT_PER_RADIAN	lbf- ft/rad
ROTATIONAL_STIFFNESS_POUND_FORCE_FOOT_PER_DEGREE	lbf- ft/deg
SECOND_MOMENT_OF_AREA_METER_TO_FOURTH	$m^4$
SECOND_MOMENT_OF_AREA_MILLIMETER_TO_FOURTH	$mm^4$
SECOND_MOMENT_OF_AREA_CENTIMETER_TO_FOURTH	$cm^4$
SECOND_MOMENT_OF_AREA_INCH_TO_FOURTH	$in^4$
SECOND_MOMENT_OF_AREA_FOOT_TO_FOURTH	$ft^4$
THERMAL_CONDUCTIVITY_WATT_PER_METER_CELCIUS	W/m-C
THERMAL_CONDUCTIVITY_KILOWATT_PER_METER_CELCIUS	kW/m- C

<b>Unit Name</b>	<b>Abbreviation</b>
THERMAL_CONDUCTIVITY_BTU_PER_HOUR_FAHRENHEIT	BTU/hr- ft-F
THERMAL_CONDUCTIVITY_INCH_POUND_FORCE_PER_SECOND_INCH_FAHRENHEIT	in-lbf/s- in-F
DYNAMIC_VISCOSITY_PASCAL_SECOND	Pa-s
DYNAMIC_VISCOSITY_KILOPASCAL_SECOND	kPa-s
DYNAMIC_VISCOSITY_MEGAPASCAL_SECOND	MPa-s
DYNAMIC_VISCOSITY_POUND_FORCE_SECOND_PER_SQ_INCH	lbf-s/in <sup>2</sup>
KINEMATIC_VISCOSITY_SQ_METER_PER_SECOND	m <sup>2</sup> /s
KINEMATIC_VISCOSITY_SQ_MILLIMETER_PER_SECOND	mm <sup>2</sup> /s
KINEMATIC_VISCOSITY_SQ_CENTIMETER_PER_SECOND	cm <sup>2</sup> /s
KINEMATIC_VISCOSITY_SQ_INCH_PER_SECOND	in <sup>2</sup> /s
KINEMATIC_VISCOSITY_SQ_FOOT_PER_SECOND	ft <sup>2</sup> /s
VOLUME CU METER	m <sup>3</sup>
VOLUME CU MILLIMETER	mm <sup>3</sup>
VOLUME LITER	L
VOLUME MILLILITER	mL
VOLUME CU INCH	in <sup>3</sup>
VOLUME CU FOOT	ft <sup>3</sup>
VOLUME CU YARD	yd <sup>3</sup>
VOLUME GALLON	gallon
VOLUME QUART	quart
VOLUME PINT	pint
VOLUME FLUID_OUNCE	ounce
UNIT_NOT_SET	
SCALAR_NULL	

<b>Unit Name</b>	<b>Abbreviation</b>
VOLUME_FLOW_RATE CU METER PER SECOND	m <sup>3</sup> /s
VOLUME_FLOW_RATE CU MILLIMETER PER SECOND	mm <sup>3</sup> /s
VOLUME_FLOW_RATE LITER PER SECOND	L/s
VOLUME_FLOW_RATE MILLILITER PER SECOND	mL/s
VOLUME_FLOW_RATE CU INCH PER SECOND	in <sup>3</sup> /s
VOLUME_FLOW_RATE CU FOOT PER SECOND	ft <sup>3</sup> /s
VOLUME_FLOW_RATE CU YARD PER SECOND	yd <sup>3</sup> /s
VOLUME_FLOW_RATE GALLON PER SECOND	gallon/s
VOLUME_FLOW_RATE GALLON PER MINUTE	gallon/min
ELECTRICAL_INDUCTANCE_HENRY	H
ANGLE_DEGREE_SYMBOL	°
ANGLE_MINUTE_SYMBOL	'
ANGLE_SECOND_SYMBOL	"
DISTANCE_FOOT_SYMBOL	'
DISTANCE_INCH_SYMBOL	"
AREA_HECTARE	hectare
FORCE_PER_AREA_NEWTON_PER_SQ_MILLIMETER	N/mm <sup>2</sup>
DYNAMIC_VISCOSITY_POISE	P
DYNAMIC_VISCOSITY_CENTIPOISE	cP
VOLUME CU CENTIMETER	cm <sup>3</sup>
ANGULAR_MOMENTUM_POUND_MASS_SQ FOOT PER SECOND	lbm· ft <sup>2</sup> /s
ELECTRICAL_FIELD_STRENGTH_VOLT_PER FOOT	V/ft
MOMENTUM_POUND_MASS FOOT PER SECOND	lbm·ft/s
MAGNETIC_FIELD_STRENGTH_AMPERE_PER FOOT	A/ft
VOLUME_FLOW_RATE CU METER PER MINUTE	m <sup>3</sup> /min

<b>Unit Name</b>	<b>Abbreviation</b>
VOLUME_FLOW_RATE CU METER PER HOUR	m <sup>3</sup> /hr
FORCE_PER_AREA_PASCAL_PER_METER	Pa/m
FORCE_PER_AREA_MILLIPASCAL_PER_METER	mPa/m
FORCE_PER_AREA_KILOPASCAL_PER_METER	kPa/m
FORCE_PER_AREA_MEGAPASCAL_PER_METER	MPa/m
FORCE_PER_AREA_POUND_FORCE_PER_SQ_INCH_PER_INCH	psi/in
FORCE_PER_AREA_KIP_PER_SQ_INCH_PER_INCH	ksi/in
FORCE_PER_AREA_POUND_FORCE_PER_SQ_FOOT_PER_FOOT	psf/ft
FORCE_PER_AREA_KIP_PER_SQ_FOOT_PER_FOOT	ksf/ft
FORCE_PER_AREA_BAR_PER_METER	bar/m
FORCE_PER_AREA_MILLIBAR_PER_METER	mbar/m
FORCE_PER_AREA_ATMOSPHERE_PER_METER	atm/m
FORCE_PER_AREA_NEWTON_PER_CU_MILLIMETER	N/mm <sup>3</sup>
FORCE_PER_AREA_MILLIMETERS_OF_WATER_PER_METER	mmw/m
FORCE_PER_AREA_INCHES_OF_WATER_PER_FOOT	inw/ft
FORCE_PER_AREA_MILLIMETERS_OF_WATER	mmw
FORCE_PER_AREA_INCHES_OF_WATER	inw
MOMENT_NEWTON_METER	N-m
MOMENT_DECA_NEWTON_METER	DN-m
MOMENT_HECTO_NEWTON_METER	HN-m
MOMENT_KILO_NEWTON_METER	kN-m
MOMENT_MEGA_NEWTON_METER	MN-m
MOMENT_TERA_NEWTON_METER	TN-m
MOMENT_KILOGRAM_FORCE_METER	kgf-m
MOMENT_TONNE_FORCE_METER	tonnef- m

<b>Unit Name</b>	<b>Abbreviation</b>
MOMENT_POUND_FOOT	lb-ft
MOMENT_POUND_INCH	lb-in
MOMENT_TON_UK_FOOT	tonuk-ft
MOMENT_TON_US_FOOT	tonus-ft
FIRST_MOMENT_OF_AREA_METER_TO_THIRD	m <sup>3</sup>
FIRST_MOMENT_OF_AREA_MILLIMETER_TO_THIRD	mm <sup>3</sup>
FIRST_MOMENT_OF_AREA_CENTIMETER_TO_THIRD	cm <sup>3</sup>
FIRST_MOMENT_OF_AREA_INCH_TO_THIRD	in <sup>3</sup>
FIRST_MOMENT_OF_AREA_FOOT_TO_THIRD	ft <sup>3</sup>
TORSIONAL_WARPING_CONSTANT_METER_TO_SIXTH	m <sup>6</sup>
TORSIONAL_WARPING_CONSTANT_MILLIMETER_TO_SIXTH	mm <sup>6</sup>
TORSIONAL_WARPING_CONSTANT_CENTIMETER_TO_SIXTH	cm <sup>6</sup>
TORSIONAL_WARPING_CONSTANT_INCH_TO_SIXTH	in <sup>6</sup>
TORSIONAL_WARPING_CONSTANT_FOOT_TO_SIXTH	ft <sup>6</sup>
VOLUME_FLOW_RATE_LITER_PER_MINUTE	L/min
VOLUME_FLOW_RATE CU_FOOT_PER_MINUTE	ft <sup>3</sup> /min
LINEAR_VELOCITY_FOOT_PER_MINUTE	ft/min
TIME_FORTNIGHT	ftnt
SLOPE_ANGLE_RADIAN	rad
SLOPE_ANGLE_DEGREE	deg
SLOPE_ANGLE_MINUTE	min
SLOPE_ANGLE_SECOND	sec
SLOPE_PERCENT	%
SLOPE_PER_THOUSAND	‰
SLOPE_RATIO_SEPARATOR	/

<b>Unit Name</b>	<b>Abbreviation</b>
SLOPE_RATIO_METER_IN_METER	m / m
SLOPE_RATIO_CENTIMETER_IN_METER	cm / m
SLOPE_RATIO_CENTIMETER_IN_CENTIMETER	cm / cm
SLOPE_RATIO_MILLIMETER_IN_METER	mm / m
SLOPE_RATIO_MILLIMETER_IN_CENTIMETER	mm / cm
SLOPE_RATIO_MILLIMETER_IN_MILLIMETER	mm / mm
SLOPE_RATIO_YARD_IN_YARD	yd / yd
SLOPE_RATIO_FOOT_IN_YARD	ft / yd
SLOPE_RATIO_FOOT_IN_FOOT	ft / ft
SLOPE_RATIO_INCH_IN_YARD	in / yd
SLOPE_RATIO_INCH_IN_FOOT	in / ft
SLOPE_RATIO_INCH_IN_INCH	in / in
ENUM_EACH	ea
ENUM_PER_TEN	/tn
ENUM_PER_HUNDRED	%
ENUM_PERCENT	%
ENUM_PER_THOUSAND	‰
ENUM_TEN	tn
ENUM_HUNDRED	cn
ENUM_THOUSAND	th
ENUM_DOZEN	dz
ENUM_PER_DOZEN	/dz
LINEAR_PER_ANGULAR_MILLIMETER_PER_RADIAN	mm/rad
LINEAR_PER_ANGULAR_METER_PER_DEGREE	m/deg
LINEAR_PER_ANGULAR_MILLIMETER_PER_DEGREE	mm/deg

<b>Unit Name</b>	<b>Abbreviation</b>
LINEAR_PER_ANGULAR_INCH_PER_DEGREE	in/deg
FORCE_PER_AREA_PASCAL_GAUGE	Pag
FORCE_PER_AREA_MILLIPASCAL_GAUGE	MPag
FORCE_PER_AREA_KILOPASCAL_GAUGE	psig
FORCE_PER_AREA_MEGAPASCAL_GAUGE	MPag
FORCE_PER_AREA_POUND_FORCE_PER_SQ_INCH_GAUGE	psig
FORCE_PER_AREA_KIP_PER_SQ_INCH_GAUGE	ksig
FORCE_PER_AREA_POUND_FORCE_PER_SQ_FOOT_GAUGE	psfg
FORCE_PER_AREA_KIP_PER_SQ_FOOT_GAUGE	ksfg
FORCE_PER_AREA_BAR_GAUGE	barg
FORCE_PER_AREA_MILLIBAR_GAUGE	mbarg
FORCE_PER_AREA_NEWTON_PER_SQ_MILLIMETER_GAUGE	N/mm <sup>2</sup> g
FORCE_PER_AREA_MILLIMETERS_OF_WATER_GAUGE	mmwg
FORCE_PER_AREA_INCHES_OF_WATER_GAUGE	inwg
NPD_INCH	in
NPD_MILLIMETER	mm
MOMENT_PER_DISTANCE_NEWTON_METER_PER_METER	N-m/m
MOMENT_PER_DISTANCE_NEWTON_METER_PER_MILLIMETER	N- m/mm
MOMENT_PER_DISTANCE_NEWTON_MILLIMETER_PER_METER	N- mm/m
MOMENT_PER_DISTANCE_KILONEWTON_METER_PER_MILLIMETER	kN- m/mm
MOMENT_PER_DISTANCE_KILONEWTON_MILLIMETER_PER_METER	kN- mm/m
MOMENT_PER_DISTANCE_POUND_FORCE_FOOT_PER_INCH	lbf-ft/in
MOMENT_PER_DISTANCE_POUND_FORCE_INCH_PER_INCH	lbf-in/in
MOMENT_PER_DISTANCE_POUND_FORCE_FOOT_PER FOOT	lbf-ft/ft

Unit Name	Abbreviation
MOMENT_PER_DISTANCE_POUND_FORCE_INCH_PER FOOT	lbf-in-ft
MOMENT_PER_DISTANCE_KIP_FORCE_FOOT_PER_FOOT	kip-ft/ft
MOMENT_PER_DISTANCE_KIP_FORCE_FOOT_PER_INCH	kip-ft/in
MOMENT_PER_DISTANCE_KIP_FORCE_INCH_PER_FOOT	kip-in/ft
MOMENT_PER_DISTANCE_KIP_FORCE_INCH_PER_INCH	kip-in/in
WIRE_GAUGE_AWG	AWG
WIRE_GAUGE_MILLIMETER	mm
WIRE_GAUGE_INCH	in
WIRE_GAUGE_MIL	mil
WIRE_GAUGE_CIRCULAR_MIL	cmil
WIRE_GAUGE_KILO_CIRCULAR_MIL	kcmil
WIRE_GAUGE_SQUARE_MILLIMETER	mm <sup>2</sup>
NPD_NATIVE_INCH	native
NPD_NATIVE	native

## APPENDIX C

# Appendix: Implementing a Work Breakdown Structure (WBS)

WBS functionality can provide significant benefits to the project, especially in the later stages of engineering and during construction. Careful planning and decision making based on a study of the following factors will lead to successful implementation of WBS functionality on projects.

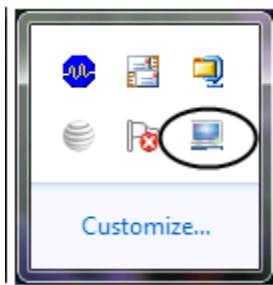
- **Decide on Required WBS Type and Purpose** – You can modify WBS type and purpose by changing the delivered codelist. The exclusive flag setting must be considered while customizing this list, because the exclusive setting is valid across a given type and purpose value. For example, it is beneficial to use the exclusive flag while creating WBS items for isometric drawing generation so that a single component does not accidentally show up in multiple isometric drawings. However, there could be multiple isometric drawings for the same pipeline, such as a fabrication isometric and a stress isometric. This results in the requirement to have multiple WBS purpose values that match the type of isometric drawing. Similar consideration applies for contract types.
- **Understand Usage of WBS Items in Terms of Software Operation** – How the WBS items you create are used drives the type of design objects to be assigned to the WBS item. For example, if the WBS is being used to generate single sheet isometrics, then piping parts should be assigned. This is because the isometric generation code in the Drawings and Reports task looks for the collection of piping parts in order to generate the piping isometric. In the software, the isometric generation code automatically looks for connections and pipe supports connected to these parts. As such, there is no need to explicitly assign connections to the WBS item. In another example, if a pipeline can only belong to a single painting contract and the objective of the contract definition is to estimate materials, then it might be easier to assign the pipeline (design object) to a contract (WBS item). A custom report can expand the pipeline into individual parts to calculate surface area and estimate. In general, it is better to assign as few objects as possible to a WBS item. This reduces the work involved in assignment and also minimizes the number of relationships stored in the database.
- **Select WBS Assignment Method** – WBS assignments can be done manually after the objects are placed, automatically during initial placement, or automatically after placement through a custom command. Choosing the right method for your specific usage is largely determined by two factors: the number of WBS items expected and the moment in time when the WBS items can be defined. For example, if the WBS is being used to define design areas, the number of design areas in a typical project is limited, perhaps up to a few dozen. Because design areas can be defined very early in a project cycle, it is reasonable to use the automatic assignment by setting the active WBS item during modeling. On the other hand, if the WBS is being used to define single sheet isometrics, there can potentially be thousands of sheets in a typical project. Because the number of sheets and the naming of those sheets cannot be defined in advance of modeling, the automated creation of WBS items and the automated assignment of design objects after placement becomes necessary. As a result, a custom command may have to be created in order to implement WBS on a project.
- **Access Control and Status Management** – As mentioned previously, in order to assign objects to a WBS item, you must have Write permission to that WBS Item. The assignment

method chosen must take this into consideration. In a Global Workshare Configuration, for example, a single WBS Item cannot be shared across multiple locations because the users at the remote location cannot assign objects to the WBS item owned by the host or the other location. It is important to clearly define how the status of WBS items is managed. In an isometric generation using a WBS scenario where an isometric drawing is issued/approved, the WBS items that represent the drawing and the actual pipeline in the model must be locked using Approval status. Leaving either one in a modifiable state can allow significant changes to the isometric drawing

## Appendix: S3D Memory Monitor

S3D Memory Monitor is a software that receives periodic notifications from the applications that use the memory monitoring service. These notifications give information on the monitored applications' memory usage. They display alert notices if memory use enters a warning or critical level. S3D Memory Monitor can also be used to establish those levels.

Under normal conditions, S3D Memory Monitor appears as an icon in the **Windows System Tray** (the area in the lower right-hand corner of the screen). The circled image below shows the S3D Memory Monitor icon.



If you exit S3D Memory Monitor while the dialog box is displayed, the next time you start S3D Memory Monitor, the dialog box will be displayed. If you exit while S3D Memory Monitor is an icon, it will be an icon the next time you start S3D Memory Monitor.

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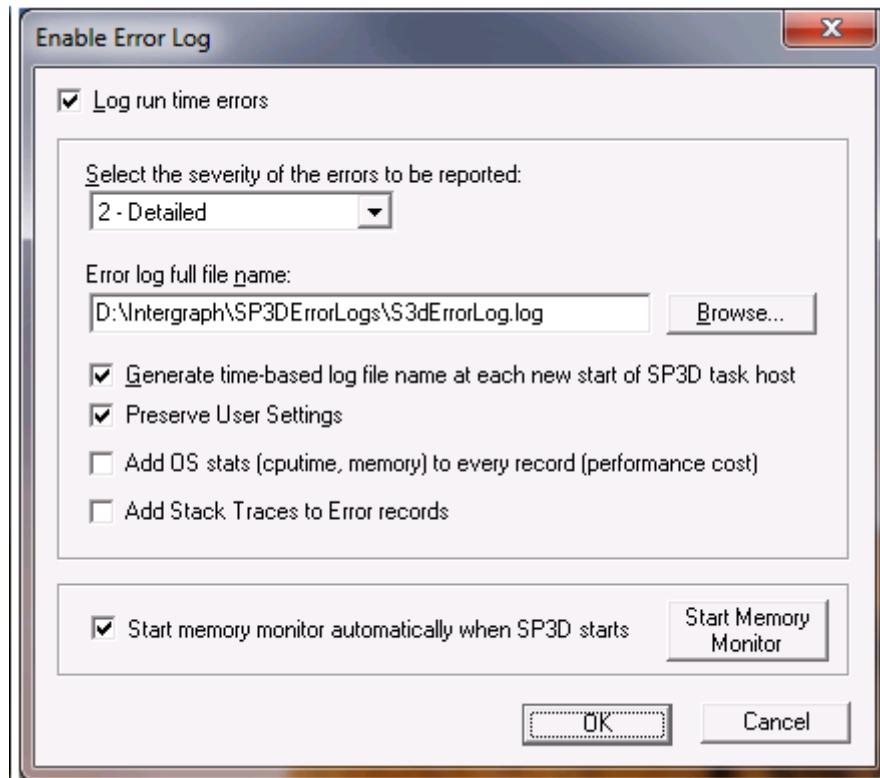
### What do you want to do?

- *Run the S3D Memory Monitor manually* (on page 668)
- *Run the S3D Memory Monitor automatically* (on page 669)
- *Display the S3D Memory Monitor dialog box* (on page 669)
- *Copy memory statistics to the clipboard* (on page 669)
- *Remove a process that has exited in a Critical or Warning state* (on page 670)
- *Set options for the S3D Memory Monitor* (on page 670)
- *Exit the S3D Memory Monitor* (on page 670)

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## Run the S3D Memory Monitor manually

1. Run the **Enable Error Log** application. This application is delivered in the **\Tools\Administrator\Bin** folder under Core.

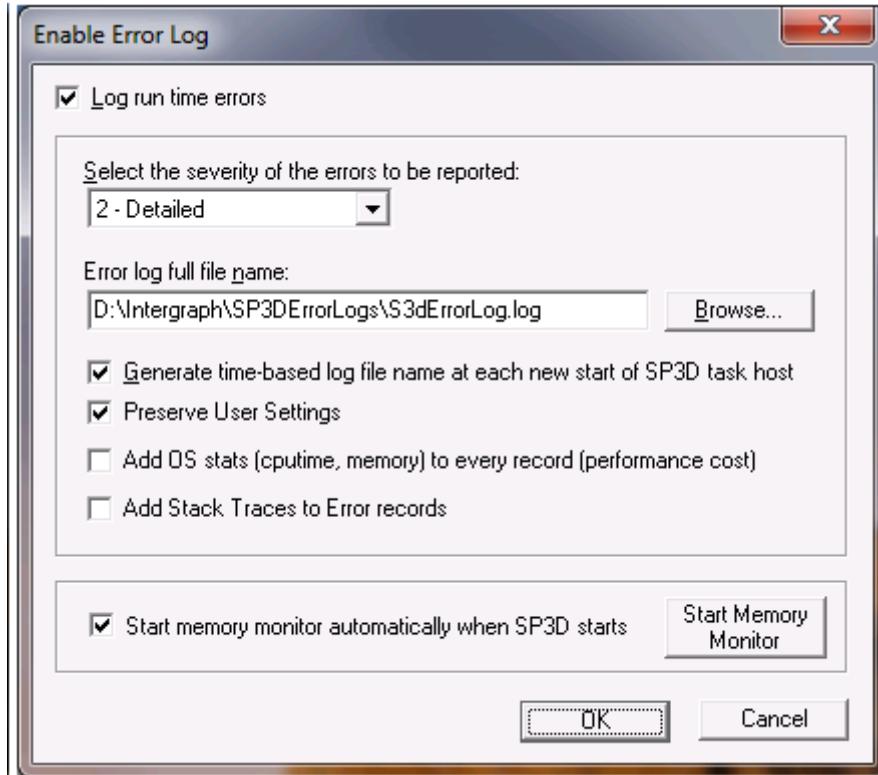


2. Click **Start Memory Monitor**.

Regardless of how many times you click the **Start Memory Monitor** button, only a single instance of S3D Memory Monitor will run.

## Run the S3D Memory Monitor automatically

1. Run the **Enable Error Log** application. This application is delivered in the **\Tools\Administrator\Bin** folder under Core.



2. Click **Start memory monitor automatically when SP3D starts**.

## Display the S3D Memory Monitor dialog box

1. Double-click **S3D Memory Monitor** in the system tray.  
*The S3D Memory Monitor dialog box displays.*

## Copy memory statistics to the clipboard

1. From the **S3D Memory Monitor** dialog box, click the ... button for the process.  
*The S3D Memory Stats dialog box displays.*
2. Click **Copy**.

## Remove a process that has exited in a Critical or Warning state

1. From the **S3D Memory Monitor** dialog box, click the ... button for the process that has exited. Exited processes are highlighted.  
*The **S3D Memory Stats** dialog box displays.*
2. Click **Remove**.

## Set options for the S3D Memory Monitor

1. From the **S3D Memory Monitor** dialog box, click **Options**.
2. Set the options to meet your needs. For more information, see *Options Dialog Box* (on page 673).

## Exit the S3D Memory Monitor

1. Click **Exit** on the **S3D Memory Monitor** dialog box.

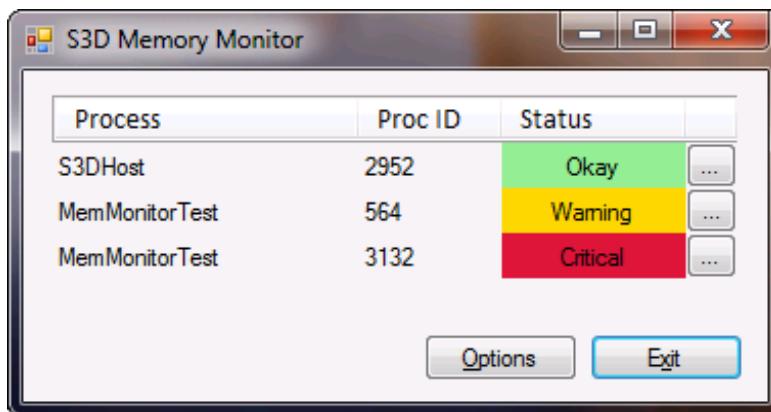
OR

Right-click **S3D Memory Monitor**  in the **Windows System Tray**, and select **Exit** from the menu.

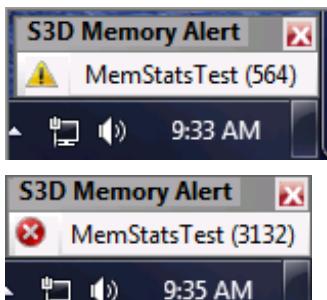
## S3D Memory Monitor Dialog Box

Displays memory usage for monitored applications. All processes that are found display in a list. The **S3D Memory Monitor** dialog box adds new rows as reporting processes become active, and removes a row if a process exits (with the exceptions noted below). If you start multiple instances of Smart 3D, each instance is reported.

As S3D Memory Monitor monitors processes, the memory use for those processes can enter **Warning** or **Critical** states.



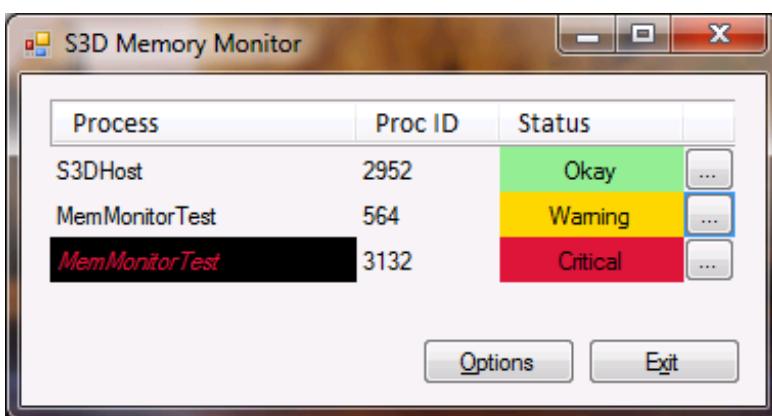
When a process goes into a warning or critical state, S3D Memory Monitor displays a small window along the bottom of the screen. These alert boxes display even if S3D Memory Monitor itself is minimized in the **System Tray**.



The alert boxes will remain for a few seconds (the default is 10), then fade away. If you hover over an alert box, a tooltip similar to that shown on the main application window displays.

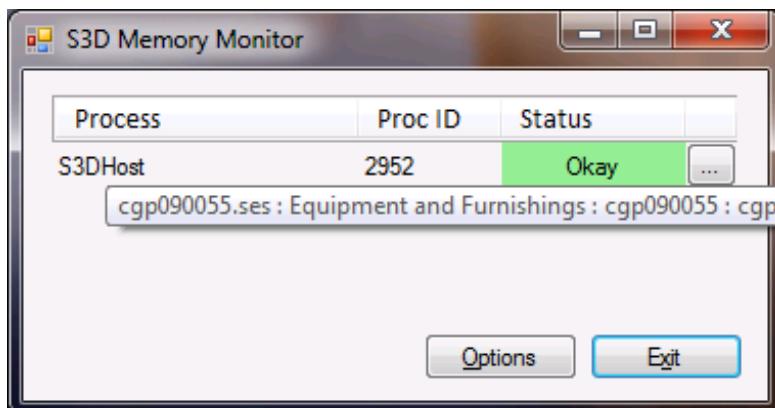
If a process is in a **Warning** or **Critical** state and then goes to the **Okay** state, then the alert box immediately disappears. You can also dismiss the alert box by clicking the red X on the title bar.

If a reporting process exits while in a **Warning** or **Critical** state, the row on the main dialog box corresponding to that process will *not* go away. Instead, the process name *highlights*.



### Process

Displays the name of the process. Hover the pointer over a process name to display a tooltip with the Main Window caption for the reporting process.



**Proc ID**

Displays the process identification number for the process.

**Status**

Displays the status (**Okay**, **Warning**, or **Critical**) for the process.

...

Displays a continuously updated **S3D Memory Stats** dialog box for the process. S3D Memory Monitor can simultaneously display a dialog box for each monitored process. For more information, see *S3D Memory Stats Dialog Box* (on page 672).

**Options**

Displays the **Options** dialog box. For more information, see *Options Dialog Box* (on page 673).

**Exit**

Closes the **S3D Memory Monitor** dialog box.

## S3D Memory Stats Dialog Box

Displays memory statistics for the process.

**Process**

Displays the name of the process. Hover the pointer over a process name to display a tooltip with the Main Window caption for the reporting process.

**Proc ID**

Displays the process identification number for the process.

**Free memory**

Displays the amount of unallocated memory.

**Largest free block**

Displays the size of the largest block of unallocated memory.

**Total memory used**

Displays the sum quantity of memory in use by the process.

**Remove**

Deletes a hanging process. This button is only available if the process has exited. Processes in this condition display as highlighted on the **S3D Memory Monitor** dialog box.

**Copy**

Writes the statistics from the dialog box to the clipboard. From there, you can paste the statistics into the application of your choice.

**Close**

Exits the **S3D Memory Stats** dialog box.

## Options Dialog Box

Displays settings for various options for the S3D Memory Monitor.

### Opacity

Determines the opacity of **S3D Memory Monitor** dialog boxes. Lower opacity means that you can use S3D Memory Monitor even when it is in **AlwaysOnTop** mode. Default is 100%.

### Always on top

When checked, the S3D Memory Monitor application is the topmost window. The default is unchecked.

### Show alerts

When checked, S3D Memory Monitor will display the memory alerts at the bottom of the Windows screen. Default is checked.

### Length of time alerts are displayed

Displays the length of time that the alerts are displayed before automatically disappearing. The minimum value for this field is one second.

### Free memory warning limit

When the free memory for a reporting process falls below this limit, the process is shown in warning state. If **Show alerts** is checked, an alert box will also be displayed.

### Free memory critical limit

When the free memory for a reporting process falls below this limit, the process is shown in critical state. If **Show alerts** is checked, an alert box will also be displayed.

### Largest free block warning limit

When the largest free block for a reporting process falls below this limit, the process is shown in warning state. If **Show alerts** is checked, an alert box will also be displayed.

### Largest free block critical limit

When the largest free block for a reporting process falls below this limit, the process is shown in critical state. If **Show alerts** is checked, an alert box will also be displayed.

# Glossary

## ***abaft***

Toward the stern of a ship, behind, further aft than.

## ***abstract part***

A part that is only defined by a partial specification and that cannot be materially provided by the organization that defines the specification.

## ***Active Template Library (ATL)***

Set of class templates and wizards supplied with Microsoft C++ Version 5.0 and later. You can use an ATL when you create ActiveX controls and any other type of object that uses the Component Object Model (COM) model. Using an ATL is generally preferred over Microsoft Foundation Classes (MFC), because the implementations are smaller, easier to use, and more closely tied to the COM model.

## ***aft***

Toward, at, or near the stern.

## ***after body***

The hull from aft of the midship section.

## ***aftermost***

Nearest the stern.

## ***angle***

The circular measurement taken from the intersection of two pipes at a turn or branch.

## ***approval state***

Recorded state of acceptance of information contained in objects within the database. The approval states indicate a level of confidence in the information stored in the database and govern your ability to alter specific data about a product.

## ***arrangement (accommodation)***

Those components of a system arranged in three-dimensional space with accurate dimensional representation for installation. Various types include electrical, HVAC, machinery, outfitting, and piping.

## ***attribute***

A single type of non-graphics information that is stored about an object such as diameter or end preparation.

***axis***

An imaginary line used to define the orientation of a system or object normally defined in terms of an x-, y-, and z-axis. Some 3-D graphic objects have an associated axis used to define the center or axis for rotations.

***basic design***

Engineering definition of the model and its systems.

***bill of material (BOM)***

Hierarchical decomposition of a product into constituent assemblies and parts. Specific types of BOMs exist (for example, an EBOM is a bill of material from the point of view of an engineering department; an MBOM is a bill of material from the point of view of manufacturing).

***built ships***

Complete database of NGC information after completion of the ship contract.

***bulkload***

The process by which reference data in Microsoft Excel workbooks is loaded into the Catalog database.

***catalog***

Repository of information about components and materials used in construction. When you use catalog parts in the model, the software places an occurrence of the catalog part in the project. This occurrence is a copy of the actual catalog part.

***Catalog database***

The database that contains the reference data. Each model database can reference a different Catalog database.

***ceiling***

Overhead design of the cabin area, including distribution systems for power, water, and ventilation.

***chain***

A set of continuous and tangent segments.

***change history***

Process of recording information such as who, when, and why for any given modification.

***change management***

Software features or manual procedures for managing the consequence of change. For example, software can support a change management feature to report drawings that need updating as a result of a change in a 3-D model.

***change propagation***

Ability of the software to intelligently modify dependent design information to reflect change in a higher order object.

***class***

Grouping of individual objects that share some very significant, common characteristics.

***class rule check***

Verification that the developing design meets the rules of a particular classification society, such as ABS, Lloyd's, or DNV.

***Class Rules***

Classification Society Design Rules.

***classification folder***

A folder in the Catalog hierarchy that contains part classes. Classification folders are one level above part classes. The ClassNodeType and R-ClassNodeDescribes sheets in the Microsoft Excel workbooks define the classification folders.

***codelist***

A set of acceptable values for a particular property that can be referred to by an index number or selected in a combo box. For example, the codelist for the material specification allows you to select from a set of standard entries, such as ASTM A183-F316 Stainless Steel.

***commodity code***

A user-defined code that provides an index to parts in a catalog.

***commodity item***

A standard component found in a manufacturer catalog (an off-the-shelf component).

***component***

Physical part that a feature generates.

***concurrent access***

Ability of the software to allow multiple users to simultaneously access and modify the design of a model.

***consolidated tasks***

A collection of tasks run in batch. For example, the software allows you to extract a set of drawings immediately or to schedule the batch extraction for a future time.

***constraints***

A logical restriction that controls how part symbols ports relate to each other and to reference ports. There are four constraints: parallel, perpendicular, coincident, and distance.

***contract***

A Work Breakdown Structure object representing a scope of work, usually performed by an external supplier. The contract is related to a project and appears in the Work Breakdown Structure hierarchy.

***control point***

A point that is used to control the shape of a NURBS curve or surface. Curves have a one-dimensional array of control points, while surfaces have a two-dimensional array.

***coordinate***

The location of a point along the X-, Y-, or Z-axis.

***coordinate system***

A geometric relation used to denote the location of points in the model. The most common coordinate system is the rectangular coordinate system, whereby points are located by traversing the X-, Y-, and Z-axes of the model. Normally, coordinate systems have their origin defined as 0,0,0.

***cutting plane***

A plane that cuts through an object.

***damage records***

Data relating to the damage and repair of structure or components that occurred during or after construction of a plant.

***data interchange***

Capability to output the design, or portions of the design, in a standard format for use or movement to another computer software system.

***database***

Repository for the product model data. The database contains information to describe individual objects in the data model and the relationships between objects as appropriate.

***database backup***

Process of recording a backup copy of the complete database or the incremental changes after the date that the last complete copy was created.

***database break and recovery***

Utilities used to restore a database after files are corrupted.

***database copy***

Functionality to copy large collections of model objects from one design project to another design project.

***database management***

Functionality related to managing a product model database.

***database monitor record***

Transactions that occur in order to provide database (DB) recovery after a stop in response with a minimum of lost data.

***degree***

The highest polynomial factor in the curve or surface mathematical definition. A line is a degree 1 curve, while a cubic B-spline is a degree 3 curve.

***design alternative***

Difference in a design represented by a separate version. A design alternative can be a new design prepared as a proposed change, or one of several elective options that the builder or customer selects. Each design alternative has an identification assigned so you can uniquely refer to the design alternatives.

***design approval log***

Record of review and approval of parts of the design.

***design data auto input***

Automation in loading existing design data into a new design database.

***design documents***

Drawings, sketches, material lists, procedures, and so forth that are generated during the design phase.

***design object***

Any object with properties that you can select. A design object can be related to one or more contracts of different types, but related only to one contract of a given type.

***design progress check***

Analysis of the content of the design to some metric unit that gives an idea of the degree of completion.

***design review***

Functionality to support rapid viewing of the design and markup of features with comments.

***design service***

Any general system services related to the design function.

***design standard***

Feature or object used in plant design that has been determined to the normal or approved way of accomplishing a design requirement. In the context of computer software, the term refers to computer functionality to support standards, not the standard itself.

***detail schedule***

Lowest level of schedule used to manage and track work progress.

***distributed systems***

Systems consisting of sequential parts with a distributive characteristic (for example, pipes distribute fluids, HVAC distributes air, cabling distributes power, and structure distributes loads).

***distribution systems***

Term synonymous and used interchangeably with the term distributed systems.

***documentation***

Drawings and other records that you must produce to document, obtain approval, or build the design.

***drawing tool***

Tool that helps in the process of creating, modifying, or manipulating objects. Examples are PinPoint and SmartSketch.

***easting***

A term that describes an east coordinate location in a coordinate system.

***edge***

A topological object that represents a trimmed curve bounded by a start and end vertex.

***edge distance***

The distance from the center of a bolt or rivet to the edge of a plate or flange.

***equipment catalog***

Catalog of equipment geometry and limited properties that the software uses to identify and visualize equipment and its placement in the model. The catalog is not the source for the total specification and ordering data for the object.

***external appendages***

External structure attached to the hull, such as the propeller nozzle, shaft struts, bilge keel, and so forth.

***fabricate***

To cut, punch, and sub-assemble members in the shop.

***face***

A topological object that represents a trimmed surface bounded by a loop of edges.

***face plate***

An edge reinforcement type that places a plate or profile at the selected plate edge.

***face-to-face***

The overall length of a component from the inlet face to the outlet face.

***fasteners***

Bolts and rivets used to connect structural members.

***element***

Primitive geometric shape such as a line, circle, or arc.

**fence**

Boundary or barrier that separates or closes off an area. To surround or close like a fence.

**field adjustment**

Material added to the neat design geometry of piping or structural parts to allow for fit up in the case that extra material is required due to uncontrolled variance in the manufacturing and construction process.

**fire integrity**

Deck and bulkhead treatments and fire and smoke blocks for fire control and retardation.

**flavor**

A different variation of a symbol. Each variation has different occurrence property values.

**focus of rotation**

A point or line about which an object or view turns.

**full penetration weld**

A type of weld in which the weld material extends through the complete thickness of the components being joined.

**function points**

Part of the requirements documentation, function points are the smallest granularity of a requirement statement that describe specific detailed actions that the software performs.

**functional block diagram**

Schematic representation of a system (piping, electrical, ventilation) showing system parts and their relationship. You use symbols to represent equipment and components. A connecting network of lines illustrates their relationship. Taken together, the symbols and the network illustrate the function of the system.

**furnishings**

Parts such as movable articles and fittings that normally are not associated with a system (for example, a chair).

**generic specific**

Object that is parametrically defined or defined to suit a family of specific parts (for example, International Standards parametrics). For example, a 100 - 200 gpm pump in the catalog can provide a general shape to appear in the model until a specific object has been identified. See also specific and specific object.

**GUIDs**

Acronym that stands for Globally Unique Identifiers. The software automatically creates the GUIDs sheet in the Excel workbooks when you create the Catalog database and schema. The purpose of storing GUIDs within Excel workbooks is to help you keep track of what has been loaded into the database. Storing GUIDs also helps to avoid the situation in which a replacement Catalog database causes existing models to become invalid.

***host location***

The first location created for a Site. This host location is defined when the Database Wizard creates the Site database.

***host server***

The database server on which the Site database was created using the Database Wizard. Alternatively, if it is a restored database set, the Host Server is the database server where the Site database is restored. The Host Server in a Workshare environment contains the origin for the Site, Site Schema, Catalog, and Catalog Schema databases. Consequently, most Project Management and reference data work must take place at the Host.

***initial design***

Early stage of design work, generally before contract, used to estimate construction costs and provide a rough concept of the intended plant. Contains information relating to a plant created during its initial (concept) design period.

***initial structural plan***

Principal structural plan for the plant; also called a construction profile.

***instantiation***

Occurrence of a catalog object at a specific geometric location in the model.

***interference checking***

A process that identifies possible collisions or insufficient clearance between objects in the model.

***job order***

Industrial authorization for accomplishing work; synonymous with a work order.

***joiner***

Non-structural bulkheads, and trim and built-in furnishings.

***kinematics analysis***

Analysis of mechanical motion.

***ksi***

Kips per square inch.

***leg length analysis***

Preferred term is welding length analysis.

***library***

Resource of reference information that you can access in developing a plant design.

***life cycle database***

Information developed to assist in the maintenance and modernization of delivered plants.

***link***

Way to store information about another file in your document. You can update a link so that changes in the file appear in your document.

***lintel***

A horizontal member used to carry a wall over an opening.

***load group***

A grouping in which all components feature uniform load limits and stress safety characteristics. For example, if a pipe clamp from load group 5 has a maximum nominal load of 20kN, then so does a threaded rod from load group 5.

***location***

A Location is defined by three user-defined inputs: 1) a unique name, 2) a unique name rule ID, and 3) the server where the Site databases reside for that Location. A Location is defined and created when the Site database is created using the Database Wizard. Additional Locations can be created in the Project Management task. Each Location is a Site-level object, thus other Plants within the same Site collection can use the Locations when the Plants are configured for Workshare.

***logical member***

An object in the model used to represent the design topology.

***machinery***

Major pieces of equipment installed in a plant.

***macro***

A sequence of actions or commands that can be named and stored. When you run the macro, the software performs the actions or runs the commands. You can create the macros in Visual Basic or other OLE-aware programming applications. Some of the other OLE-aware programming applications are Visual Basic for Applications, Visual C++, and so forth.

***maintenance envelope***

A rectangular box around the part for clearance during maintenance operations.

***maintenance parts***

Required material for depot or on-board repair or overhaul of equipment, as determined by engineering study. Generally at a level below the purchased construction object of the plant.

***maintenance records***

Records of breakdown, repair, and overhaul of equipment.

***material analysis***

Analysis of a completed design work for extracting detailed material requirements; also called material lists.

***material list***

An option category that controls the format and content of the bill of materials.

***methods***

Objects in the database that describe the manufacturing methods to the component parts of a plant.

***move from point***

Starting point for an action. For example, when you move an equipment object, the Move From point determines the point of origin for the move.

***move to point***

Ending point for an action. For example, when you move an equipment object, the Move To point determines where you want the move to stop.

***MTO neutral file***

A non-graphic output file that can be fed into a material control system. MTO stands for Material Take-Off.

***natural surface***

A surface without a boundary curve.

***node***

- One of the set of discrete points in a flow graph.
- A terminal of any branch of a network or a terminal common to two or more branches of a network.
- An end point of any branch or a network or graph, or a junction common to two or more branches.

***northing***

A term that describes a north coordinate location in a coordinate system.

***nozzle***

A piping connection point to a piece of equipment.

***nozzle standout***

The shortest allowable distance between the connection point of a nozzle and the start point of a turn on the leg connected to the nozzle.

***NPD (Nominal Piping Diameter)***

The diameter of a pipe.

***object***

A type of data other than the native graphic format of the application.

***occurrence (of part or equipment)***

Instantiation of a part of equipment in the model that refers to the part library; an instance of a specific object. The design can be built several times, and therefore the occurrence can apply to more than one hull. Typically, an occurrence points back to a specific object, either for its complete definition, as in the case of a particular valve, or for its made from material, as in the

case of a steel plate part cut from sheets. Thus, when a designer selects a component from the catalog and places it at a location in the space of the plant, the software creates an occurrence of that object in the plant design.

***occurrence property***

A characteristic that applies to an individual object in the model. Occurrence properties are designated with 'oa:' in the reference data workbooks. You can view and modify occurrence properties on the Occurrence tab of the properties dialog boxes in the software. Depending on the object, some occurrence properties are read-only.

***origin***

In coordinate geometry, the point where the X-, Y-, and Z-axes intersect.

***origin point***

The point at which the coordinate system is placed, providing a full Cartesian coordinate system with positive and negative quadrants. Points are placed at coordinates relative to the origin point, represented by the X, Y, and Z values.

***orthogonal***

The characteristic of an element consisting completely of elements positioned at 90-degree angles. A square is an orthogonal element.

***orthographic***

A depiction of an object created by projecting its features onto a plane along lines perpendicular to the plane.

***P&ID***

Diagram that shows the topology, functional components, and special requirements of a piping system; generally represents the engineering design of the system.

***package***

Set of closely related classes. (UML)

***painting***

Computation of paint surface and recording of paint system requirements.

***parameter***

A property whose value determines the characteristics or behavior of something.

***part class***

A group of similar objects. You can define part classes in the Excel workbooks. A part class can have multiple parts. For example, a heat exchanger part class can contain heat exchangers with different dimensions.

***part number***

Unique identifier of a part.

**PDS (Plant Design System)**

A comprehensive, intelligent, computer-aided design and engineering application for the process, power, and marine industries. PDS consists of integrated 2-D and 3-D modules that correspond to engineering tasks in the design workflow.

**physical occurrence**

Unique specific object that has traceability and is the physical manifestation of an occurrence object. A physical occurrence applies to one and only one hull. It is a version of its occurrence object with as-built or as-modified differences included and has a serial number or lot number.

**PinPoint**

Tool that allows you to place, move, and modify elements with precision, relative to a reference point.

**principle of superposition**

The principle that states that the stresses, strains, and displacements due to different forces can be combined. This principle is only valid for linear analysis.

**product**

Data objects that describe the components of a ship and any corresponding properties. An individual object or part (or its representation in the product model) that may be installed in the ship. Examples of individual products include objects such as a coffee urn, a light fixture, a piece of pipe, a piece of ventilation duct, a radar display console, a bulkhead plate, and a structural profile stiffening a bulkhead.

**Product Data Management (PDM) System**

Software intended to manage both product data and documents associated to the product data. Functionality typically includes: object-based data modeling tools, user administration, business rules, and document management. Document management typically includes document editing or reviewing, document mark-up or redline, document storage, and full-text retrieval.

**product structure**

Hierarchical breakdown or decomposition of a product into constituent parts, volumes, or units. (For example, a bill of material is one possible type of product structure.)

**production planning**

Functionality associated with the work breakdown and sequence of the construction of a plant.

**promotion**

Process of associating approval state with a product version. A product version begins its existence at a working approval state. When the version is at some level of maturity, its approval state is elevated to a higher approval state (that is, promoted). Then, further changes must be carefully controlled and generally require the data set demoted to a working state. One or more promotions can occur successively higher approval states (between working and approved) to represent various intermediate levels of review or progressive approval.

**query select sets**

Set of objects that are selected in a query or queries on the database.

***reference data***

The data that is necessary to design plants or ships using the software. Reference data includes graphical information, such as symbols. It also contains tabular information, such as physical dimensions and piping specifications.

***resource estimation***

Rough estimate of material, manpower, and facility utilization for the design and construction of the plant.

***route***

1) A line connecting a series of points in space and constituting a proposed or traveled route. 2) The set of links and junctions joined in series to establish a connection.

***satellite server***

The database server where the replicated databases reside for Workshare. The Satellite Server is not used unless Workshare is activated.

***schema***

A database that creates the structure of another database. For example, a schema specifies the queries, tables, fields, and data types in a database.

***schema update utility***

Functionality used to assist in processing existing product models to an updated database structure after you modify or add to the database structure.

***sheetbody***

A topological object that represents a collection of faces joined along their common edges (stitched).

***shell structure***

External portion of the surface of the plant.

***ship***

A collection of modeled objects that can be simultaneously displayed and edited in a workspace. A Ship points to a Catalog (optionally shared with other Ships). Access control is managed at the Ship level.

***site***

The top level in the Project Management hierarchy. A Site configuration may contain several Catalogs, each shared by multiple Plants.

***site administrator***

Person responsible for managing the standards and general parameters for a given plant site within a Site database.

***site setup***

Functionality associated with establishing a new plant site or hull for design development.

***sketch and trace***

User interface for rough definition of a required design feature that typically works in a 2-D mode.

***specials***

An option category that allows you to control specialized calculations for equipment trim, repeatability, and center-of-gravity.

***specifications***

Contracted requirements for the plant.

***steel outfitting***

Internal structural elements of a ship that are required to meet a local requirement such as foundations, non-structural bulkheads, walkways, and so forth.

***stern frame***

Casting and structure that support the rudder and shaft opening.

***stud***

A bolt, threaded on both ends, used to connect components.

***suspended floor***

A concrete floor system built above and off the ground.

***swash bulkhead***

A longitudinal or transverse nontight bulkhead in a tank that decreases the swashing motion of the liquid contents. A plate in a tank that has this same effect but that does not extend to the bottom of the tank is called a swash plate.

***symmetric node***

Type of vertex on a curve. A curve with a symmetric node has the same curvature on each side of the node. A handle can be attached to a symmetric node for editing.

***system***

A conceptual design grouping that organizes parts in hierarchical relationships. A system represents a functional view of the model and includes information such as system name, type, properties, and design specifications for the objects assigned to the system.

***tag number***

User-specific, unique number assigned to an object (for example, CV-101 for a control valve, HE-2002 for a heat exchanger).

***target point***

The origin for coordinate measurements displayed by PinPoint. You can position the target point anywhere on the drawing sheet or view.

***tolerant geometry***

A type of ACIS geometry - either an edge or a vertex - that is outside the tolerance for ACIS and requires special handling.

***transverse***

At right angles to the fore-and-aft center line.

***transverse frames***

The athwartship members that form the ribs of the ship.

***trim***

The difference between the forward draft and the aft draft.

***trimmed surface***

A surface whose boundary is fully or partially inside the "natural" geometric definition of the surface. Some or the entire control polygon extends outside the face boundary.

***trunk***

Feature that quickly reserves space for the distributive systems and other systems that have a path. Along the trunk are stations that define the cross section and identify part or system membership.

***tumble home***

The inboard slope of the side of a ship, usually above the designed waterline.

***unit/module modeler***

Facility of the system to structure collections of equipment and components into a single identifiable object.

***user attributes***

A customized property in the reference data. The Custom Interfaces sheets in the Excel workbooks define these properties. You can list the customized properties on the individual part class sheets.

***version control***

Ability of the system to manage multiple versions of a single part of the design. Version control should support conditional analysis and promotion status, as well as alternate design features among hulls within a plant site.

***vertex***

A topological object that represents a point in the three-dimensional model.

***vertical keel***

A row of vertical plates extending along the center of the flat plate keel.

***viewset***

Set of objects (usually a subset of the entire database) that a view operation uses. Membership or lack of membership for any object in a viewset does not affect the actual stored representation of the object, but only its availability or desirability for viewing in the current scenario.

***water line***

A line parallel with the base line that depicts the water.

***watertight door***

A door that when closed prevents the passage of water.

***weather deck***

A deck exposed to the weather.

***weathertight door***

A door that when closed prevents the passage of rain and spray.

***weight and CG analysis***

Routines that compute the weight of commodity materials as configured in a given design (for example, plate and pipe) and determine total weight and center of gravity (CG) for a collection of material and equipment, as well as the complete plant.

***welding***

Weld requirements for joining materials. Welding length analysis is the calculation of required weld dimensions; also called leg length analysis.

***windlass***

The machine used to hoist and lower anchors.

***wirebody***

A topological object that represents a collection of edges jointed at their common endpoints.

***wizard***

Software routine attached to an application that provides guidance and expert help to you to complete one of the functionalities of the application.

***work content***

Estimation development of metrics from the database that relates to the work hour content of the various construction units.

***work order***

Plant authorization for completing work; synonymous with a job order.

***working plane***

The available 2-D plane of movement for endpoint selection.

***workset***

Set of objects (usually a subset of the entire database) used in an interactive change, add, or delete operation. Membership or lack of membership for any object in a workset does not necessarily affect the actual stored representation of an object. However, you can change or delete an object in a workset that also results in a change or deletion of the stored object. Similarly, when you add a new object (not currently stored) to a workset, the software also adds the object container.

***workspace***

Area that represents the portion of the model data needed to perform the intended task and includes the user modeling settings.

***workspace document***

Document into which you can extract a portion of the model data for a user task.

***Workspace Explorer***

Tree or list representation of objects in your workspace.

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